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A MONOGRAPH  
OF THE  
MOLLUSCA FROM THE GREAT OOLITE,

CHIEFLY FROM  
MINCHINHAMPTON

AND  
THE COAST OF YORKSHIRE.

BY  
J. MORRIS, F.G.S. AND JOHN LYCETT.

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## INTRODUCTION.

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THE authors of the present Monograph, after due consideration of the materials at their disposal, have thought fit to limit their illustrations to the Testacea of the Great or Bath Oolite; a term under which they would include the series of beds situated between the Fullers-earth strata upon which they repose, and the Bradford clay to which they are subjacent. To have enlarged the plan, so as to include the Testacea of the Cornbrash and Forest marble, would doubtless have been more comprehensive; but in the present state of our knowledge, the advantage would have been rather apparent than real. It will be found that the very few univalves which have been assigned to those deposits are almost without exception contained likewise in the Great Oolite, and will be found in the Monograph. It is, moreover, not impossible, that at some future time a series of univalves may be obtained from the Cornbrash, or Forest marble, differing specifically from those of the Great Oolite, in which case a separate Monograph, or an appendix to the present one, might be given.

It is much to be regretted, that collections of shells should have been procured from so few situations in the long course of the formation in this country; and when it is remembered, that the Great Oolite constitutes a member of that series of secondary rocks which first engaged the attention of geologists, some surprise will mingle with our regret. The defect, however, would appear to be of easy explanation. The shells do not lie upon the surface, or become separated from the matrix by the action of the weather; they are to be procured only by carefully working away the investing stone when practicable, which is not always the case: there are likewise large areas constituting, probably, the greater portion of the formation, which are altogether destitute of organic remains, or contain only a finely comminuted shelly drift; the areas containing assemblages of well-preserved shells, would appear to be of small extent, and the presence of several of these in the vicinity of the residence of one of the authors, together with the great profusion of undescribed testacea which they have produced, have constituted the principal inducement to the present attempt of describing them; these favorable circumstances have enabled them to ascertain the position and vertical range of the species with a greater degree of accuracy than would otherwise have been possible.

Beyond the limits of the Minchinhampton district, the number of species procured



has been but inconsiderable; these latter belong chiefly to Ancliff,<sup>1</sup> and to the vicinity of Scarborough. The parallelism of the deposits at the two former places would appear to be well ascertained, but with respect to the rocks which are so extensively exposed upon the coast of Yorkshire, although the evidence of geological position appears to be satisfactorily determined, they possess but few mineral features which serve to connect them with their supposed equivalents in Gloucestershire, Wiltshire, and Somersetshire; they constitute a great carboniferous deposit of the Oolitic period, abounding with land plants, and containing intercalated bands or thin beds of dark gray argillaceous shales, limestones, and sandstones, containing marine shells, of which only a minority of species have been identified in other localities. The evidence afforded by the few species of univalves which have been forwarded to the authors from Scarborough, through the kindness of Mr. Bean, though not conclusive, tends rather to assimilate them with the Inferior Oolite; and it will be perceived on consulting the table of species at the end of the Monograph, that of the twenty-one Yorkshire species, none have been identified with Great Oolite shells of Minchinhampton or Ancliff, but that seven agree specifically with Inferior Oolite shells of the Cotteswold hills. The Yorkshire deposits to which these remarks refer constitute the entire series of plant-bearing beds numbered 11, 12, and 13 in Phillips's 'Geology of Yorkshire,' reposing on No. 14, or the Dogger, which is proved by its fossils to be the equivalent of the Inferior Oolite, or at least to a portion of that formation. Admitting, therefore, the parallelism of the deposits containing somewhat distinct Faunas, in the north-eastern and south-western parts of the present area of England, we are naturally led to infer, either that the physical conditions might be favorable to the continuance of species in one locality, or that species characteristic of an older deposit, in a more distant region, may have migrated and lived on during the formation of a newer deposit in another, the conditions having become unfavorable to the perpetuity of their development in the latter deposit over the original region whence they had migrated.<sup>2</sup>

For the above-mentioned reasons, it has been deemed desirable to separate the

<sup>1</sup> The section at Ancliff, near Bradford, is as follows:

Rubble	. 5 feet.	. . .	Abounding with Polyparia.
Soft Oolite	15	„ . .	This is the bed celebrated for the Ancliff fossils.
Clay	. 1	„ . .	Containing small sponges, and many fragments of shells.
Rag	. 6½	„ . .	Very coarsely Oolitic.
Soft Oolite	5	„	

From Mr. Lonsdale's interesting memoir, "On the Oolitic District of Bath," in the 'Geol. Trans.,' vol. iii, p. 252, in which many other sections of the Great Oolite are given, and the range of the deposit in that neighbourhood is accurately traced.

<sup>2</sup> Unfortunately the entire character of the fauna of the Great Oolite in the centre of England is not well ascertained, nor is the range and extent, southerly, of the fluvio-marine conditions of the Yorkshire Oolite accurately determined. As bearing on this point, the reader is referred to a paper by Captain L. L. B. Ibbetson and Mr. Morris, "On the Geology of Stamford" ('Brit. Assoc. Rep.,' 1847, p. 127). The subject of migration of species, during the Oolitic epoch, is ably treated in a valuable memoir by M. Gressly, 'Observations Geologiques sur la Jura Soleurois.'



Yorkshire shells from those of the West of England, and to have them figured on separate plates, as by this arrangement it is trusted that confusion will be avoided, whatever may ultimately be determined with regard to the position of these deposits.

It will be observed that several characteristic groups of shells have been arranged into new genera and sub-genera, the knowledge of which, it is believed, will conduce materially to the identification of the members of the lower Oolitic system of rocks; of these *Ceritella*, *Brachytrema*, *Alaria*, *Cylindrites*, and *Trochotoma*, are likewise represented in the Inferior Oolite, but by other species; in no instance has any species of these genera been found common to the two formations. Other genera occur whose species are equally characteristic of the two formations; the table of comparison at the end of the memoir will indeed serve to show how small a number of the spiral univalves are really common to both formations; with the *Patelloidea* the case is somewhat different, but the entire number, excluding the Yorkshire species, is very small; a fact the more worthy of notice as a much larger number of the bivalves are common to both, or if capable of being separated, can only be regarded as sub-species, or varieties of the same species. The literature of the science has hitherto been singularly deficient in illustrations of English Great Oolite univalves; Lhwyd's '*Lithophylacii Britannici Ichnographia*' contains a few; Conybeare and Phillips, in their '*Geology of England and Wales*,' p. 210, enumerate three species. Sowerby's '*Mineral Conchology*' contains thirteen, one only of which is from the Minchinhampton district. Mr. Lonsdale's paper on the 'Oolitic district of the neighbourhood of Bath' has only three identified species. In Prof. Phillips's '*Geology of Yorkshire*,' (part I, p. 123,) fifteen species of univalves are enumerated, which are reproduced in Mr. Williamson's paper on the 'Yorkshire Oolites,'<sup>1</sup> but without descriptions. Dr. Fitton's notice of the strata at Stonesfield<sup>2</sup> gives an accurate enumeration of the different beds, but with few organic remains. In the paper by Capt. L. L. B. Ibbetson and Mr. Morris, on the 'Geology of Stamford,'<sup>3</sup> a few univalves are mentioned; and, lastly, in the '*Geology of Cheltenham*,' edited by Messrs. Strickland and Buckman, a list is given from the Stonesfield slate of East Gloucestershire of six Echinodermata, or at least fragments of them, and nineteen gasteropoda, remains of which, however, are sometimes very imperfect.<sup>4</sup> It may be

<sup>1</sup> Geol. Trans., 2d Ser., vol. v, Part i, p. 240.

<sup>2</sup> Zool. Journal, vol. iii.

<sup>3</sup> Brit. Assoc. Reports, 1847.

<sup>4</sup> The following is a section of the quarry on Sevenhampton Common, whence most of the fossils were obtained:

Soil . . . . .	2 feet.
A yellow clay, of a somewhat soapy feel, very rich in fossil shells . . . . .	6 „
Ragstone, similar to the Stonesfield slate . . . . .	— „ 4 inches.
Thin seam of soft stone, with <i>Ostrea acuminata</i> , and small joints of	
<i>Apiocrinites</i> . . . . .	— „ 3 „
Blue marl . . . . .	8 „
Ragstone . . . . .	14 „
Stonesfield slate . . . . .	4 „
Fullers-earth . . . . .	— „

gathered from these details, that in undertaking the present work, the authors have necessarily, to a great extent, entered upon an unexplored field of study,—have been compelled to investigate the relations of forms which, in very many instances, have only recently been brought under their notice, and respecting whose analogues some doubt or difference of opinion may occasionally exist: with a sincere desire to avoid error, they have in every instance rejected species of which the examples were imperfect or doubtful.

It is with pleasure and gratitude they acknowledge the assistance which they have received in the prosecution of their task, and their thanks are especially due to Professor Edward Forbes, for his valuable memoir on the Echinodermata; to D. Sharpe, Esq., for his copious notes on the Nerineæ, and other valuable suggestions; to Wm. Bean, Esq., of Scarborough; to M. Bouchard, of Boulogne; to Professor Tennant, F.G.S.; to S. V. Wood, Esq., F.G.S.; to Professor Buckman; to — Bravender, Esq., of Cirencester; and to J. Bentley, Esq., of Stamford, for the loan of specimens for comparison and figuring: to M. A. Buvignier, of Verdun, for his little work on the ‘Oolitic Fossils of the Ardennes;’—also for the opportunities afforded them in consulting the important collections of the Viscomte D’Archiac; J. Baber, Esq., F.G.S.; J. S. Bowerbank, Esq., F.R.S.; J. G. Lowe, Esq. of Chippenham; Rev. P. B. Brodie, F.G.S.; E. H. Bunbury, Esq., M.P., F.G.S.; S. P. Pratt, Esq., F.R.S.; and to Professor E. Deslongchamps, of Caen, for his obliging kindness in forwarding to them a suite of specimens typical of some of the species figured by him in a series of memoirs, containing many valuable observations, published in the seventh and eighth volumes of the ‘Mémoires de la Société Linnéenne de Normandie;’ as well as to J. de Carle Sowerby, Esq., for the loan of many of the original specimens described in the ‘Mineral Conchology;’ and to G. R. Waterhouse, Esq., and S. P. Woodward, Esq., for the facilities afforded to the authors in their examination of the species contained in the National Collection. To the artists, Messrs. Bailey and C. R. Bone, of the Ordnance Geological Survey, the authors tender their acknowledgments for the pains they have taken in the general accuracy of the lithographs.



# A MONOGRAPH

## OF THE

### MOLLUSCA FROM THE GREAT OOLITE.

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#### GENERAL GEOLOGICAL REMARKS.

THE Minchinhampton district of the Great Oolite has produced by far the greater number of our illustrative specimens; and as the formation at that locality exhibits features of a very varied as well as comprehensive character, we may be excused for entering somewhat more into detail in our remarks upon it. The Great Oolite in this portion of Gloucestershire constitutes the uppermost rock of the Cotteswold Hills; it everywhere overlies the Fullers-earth, which, in turn, reposes upon the uppermost beds of the Inferior Oolite;—there is, therefore, a regular unbroken sequence of the Oolite rocks exposed on the flanks of the various deep valleys of denudation which pervade the district. The physical features of the district are strongly marked; the larger valleys have a mean depth of about 500 feet, and exhibit what can scarcely be met with in any other part of England; a single unbroken declivity comprising the Great Oolite, Fullers-earth, Inferior Oolite, and upper portion of the Lias. The Inferior Oolite at these escarpments has a thickness of about 230 feet, the Fullers-earth of 70 feet, and the different beds of Great Oolite of 120 feet; but of these latter, only about the lower 40 feet anywhere approach to the brow of the escarpments. The narrow and deep vale of Chalford, with its lateral branches, intersects the strike of the Great Oolite, and divides the fossiliferous portion of the district into two parts; another and wider valley, further south, likewise intersects the strike of the formation. In this are situated the villages of Woodchester, Hailsworth, and Avening; but here the amount of denudation, horizontally, has been more extensive; and as the Great Oolite is likewise much less fossiliferous, it need only be adverted to as supplying many additional positions, where the rock can conveniently be quarried by open-work excavations. It will, therefore, be perceived that the natural features of the district eminently conduce to the study of its organic remains.

The mineral masses which constitute this series of beds are exclusively of marine origin, the varying character of their organic contents being connected both with the mineral character of the deposit spread upon the floor of the ancient sea, and with its depth. These deposits may be conveniently divided into three groups :

1st. The Weatherstones;      2d. The Sandstones; and      3d. The Limestones.

The weatherstones, which are situated at the base of the formation, average about 40 feet in thickness. They consist of shelly sandstones, abounding with crystalline carbonate of lime, and having Oolitic grains irregularly and sparingly distributed throughout their mass. The variety of mineral character is so great, that no two quarries, or beds of the same quarry, or even distant parts of the same bed, are alike in structure, aspect, hardness, durability, or in the abundance of their included organic relics; and they appear to have constituted a deposit both littoral and formed in a shallow sea, exposed to the influence of tides and currents. The beds, which are sometimes of considerable thickness, consist of layers of testacea, in a fragmentary state, piled confusedly, but forming, obliquely, laminated surfaces, often interrupted and crossed by others which proceed in different directions. The shelly relics often constitute a considerable proportion of the whole mass; they are converted into crystalline carbonate of lime, which frequently fills the interior of the univalves; and it is to the abundance of this mineral, disseminated everywhere, that the weatherstones owe their superior durability upon exposure to the atmosphere. As a general rule, therefore, the beds which contain the greatest abundance of shells are those which are most fitted to resist the action of frost; water percolates their structure in much smaller quantity, and more slowly, and, on escaping, carries away but little lime in solution. The open joints of the Great Oolite, adjacent to the shelly beds, are therefore nearly free from the large stalactitical masses which load the joints of the freestone in the Inferior Oolite.<sup>1</sup> With the testaceous fragments are associated shells in a perfect condition, though frequently worn and abraded, the valves of the conchifera being rarely in apposition; also, palatal bones and teeth of fishes, portions of crustacea, spines of cidaris, ossicula of pentacrinites and asterias, rolled fragments of zoophytes, and dicotyledonous wood, the partitions of the beds disclosing not unfrequently the ripple-marks of a beach. It might be imagined that beds of such a littoral character would be unsuited to the propagation and development of the Cephalopoda; and it will occasion no surprise when we find that

<sup>1</sup> For economic purposes, the weatherstones are valuable on account of their durability. In proof of this, we may refer to the good state of preservation which the ancient part of the church at Minchinhampton exhibits, and which shows a care and judgment in the selection of materials not always to be found in modern edifices. It is rather a singular fact, that Caen and Minchinhampton, the two places which have produced by far the most extensive series of Great Oolite shells, are connected historically as well as geologically. Matilda, wife of William the Conqueror, founded the nuns of the Holy Trinity at Caen, of which body one of her daughters became a member. William endowed them with the manor of Minchinhampton, at which place they had a religious establishment. They built the church, and dedicated it to the Holy Trinity. It would seem that William despoiled the Saxon Countess Goda of the manor, which she possessed in the time of Edward the Confessor, and bestowed it upon the favorites of his wife.



examples of this class of carnivorous mollusks are here few, both as to number of species and of individuals. This fact, together with the circumstance that they do not mark any particular stratum, renders it highly probable that they were not associated, when living, with the denizens of these shelly beds, but, like dead shells of the recent *Spirulæ*, individuals occasionally floated upon the surface, and were wafted to some coast or shelly strand, often very distant from their real habitat. With the chambered shells such occurrences may have been common; the air-tight little vessel, separated by decomposition from the animal, would ride upon the wave, and only suffer injury upon striking the ground of the beach. A consideration of the gregarious habits of the several families of recent, and probably also of extinct *Cephalopoda*, would lead us to regard an occasional stray individual as having travelled from some colony more or less distant; but the beds of closely-packed *Ammonites*, of every stage of growth, which occur in certain of the Jurassic rocks, would appear to be the effect of occasional rapid earthy deposits, which took place during that seasonal period when the Mollusks, lying torpid and contracted within their shells, were at once entombed in that condition. We have also an explanation of the perfect condition which the *Ammonites* of these beds usually exhibit; the place of retirement would be exempt from the turbulence of a shallow sea, and exposed only to the deposit of mud or other fine sediment, which would protect the shells from injury. In the few *Ammonites* and *Nautili* of the weatherstone beds, we see the reverse of these conditions;—those large and fragile shells, exposed in that detrital deposit to every kind of attrition and accident, are very rarely perfect; seldom more than two continuous chambers can be found which have not been invaded by earthy sediment, and often large portions of shell are wanting altogether. The paucity of the *Brachiopoda* in these beds is also worthy of notice. Three species of *Terebratula* are found associated with nearly 400 species of Mollusks; and certain genera, which are peculiarly prominent in the Oolitic rocks generally, are mostly absent; of these genera, the *Pholadomyæ*, *Homomyæ*, *Ceromyæ*, *Myopsides*, *Gresslyæ* or *Pleuromyæ*, the *Arcomyæ* and *Ceromyæ*, being exceedingly rare. The greater number of these genera are not uncommon in the limestones or upper beds of the Great Oolite, and occasionally, also, in the lower beds or sandstones, when they are separate from any shelly deposit.

The section of the shelly beds, exhibited by the great quarry upon Minchinhampton Common, affords a clear view of their distinctive characters and order of superposition. The upper part consists of thinly-laminated stone, five or six feet in thickness; to this succeeds the beds usually termed planking, a designation implying a thin bedded stone, but occasionally consisting of beds of great thickness: fourteen feet would appear to be their utmost thickness. They mark the downward limit of our new genus *Purpuroidea*, in the lowest bed of which it is very abundant.

An uncertain and variable stratum, of a few inches, of sandy marl next succeeds, in which the few casts of bivalve shells hitherto found have the valves in apposition. To this succeeds thin-bedded yellowish sandstones, nearly destitute of shells, and worthless for

economic purposes: their thickness is about twelve feet. A soft, shelly sandstone, called *oven-stone*, next occurs: the shells increase in quantity downwards: about six feet will represent its thickness. To this succeeds the weatherstones, consisting of several beds, the aggregate thickness of which is about six feet. These lower beds are very shelly; but, owing to the greater hardness of the matrix, specimens cannot be extracted in any considerable number. The blue or brown clays of the Fullers-earth support the weatherstones, without any appearance of Stonesfield slate. It is also absent in several other limited shelly deposits; but, as a general rule, throughout the district, the Great Oolite, near to its base, has one or more beds, which possess all the essential characters of Stonesfield slate. A little higher in the series than the shelly beds, the limestones occur which cover continuously a very considerable area upon both sides of the vale of Chalford, and continue upwards, with various modifications of character, even to the Bradford clay. The lowest of this series is a very compact cream-coloured semi-siliceous, but argillaceous limestone, four feet thick, divided into two beds. It is usually destitute of organic remains; but in some localities contains casts of species of *Purpuroidea*, of several species of *Natica*; and, also, at a single locality, a dense colony of our new genus *Pachyrisma*, which has not hitherto been found in any other stratum. This limestone extends even to the vicinity of Cirencester, and was employed by the Romans to form tesserae for their pavements, as noticed by Messrs. Buckman and Newmarch, in their new work on *Corinium*.<sup>1</sup> The base line of the white limestone is 60 feet above the Fullers-earth at Minchinhampton, and 45 feet, four miles to the east of that place, near to the railway (Sapperton tunnel); the measurements have been obtained by well-sinkings. Above this rock occurs a series of pale brown or chocolate-coloured limestones, sometimes compact, sometimes sandy, having between them an occasional uncertain band of marly clay. These clays are always fossiliferous, abounding in casts of bivalve shells, which have both valves generally united. The uppermost 40 feet of this series, owing to the worthless character of the stone, is very imperfectly exposed, our knowledge of it being chiefly derived from pits of no great size, opened for the repair of the roads. The eastern extremity of the railway tunnel (Sapperton) offers an extensive section of these beds, but their position does not allow of their being studied, except at a distance. The white limestone is exposed about the middle of the section. One of the road-side excavations, two miles east of Minchinhampton, and 90 feet above the Fullers-earth, has two beds of sandy limestone which is more than usually fossiliferous, they expose sections of *Nerinea*, *Pterocera*, *Natica*, *Cylindrites*, *Bulla*, *Purpuroidea*, several of the *Echinodermata*, &c. The bivalves, which are more numerous, comprise *Pholadomya*, *Homomya*, *Ceromya*, *Lucina*, and *Ceromya*. The shell is preserved in the condition of crystalline lime, but the interior mould only can be extracted entire. At three miles and a half east of Minchinhampton, a large excavation has a band of brown clay, which abounds with *Terebratula maxillata*, being almost the only fossil. This band is 115 feet above the

<sup>1</sup> 'Illustrations of the remains of Roman art in Cirencester, the site of Antient Corinium,' by Professor Buckman, F.G.S., and W. C. Newmarch. London, 1850.



Fullers-earth. In another direction, one mile south-east of the town, is a marly band, containing a dense colony of a species of *Terebratula*, which is likewise the sole fossil observed. This isolation of the *Terebratulæ* is worthy of notice; they occur but as a few stray individuals in the shelly beds of the formation: in one instance, indeed, a shelly quarry at Bussage, a little to the north of the vale of Chalford, contains a large assemblage of a smooth, undescribed species, but at that place the other genera suddenly disappear, and the *Terebratulæ* are either alone or accompanied only by a few small bivalve shells. The Bradford clay, marked by the *Terebratula digona*, has not been discovered nearer than the cuttings at the Tetbury road station, eight miles distant. The Great Oolite has now been traced upwards throughout the Minchinhampton district, but there yet remains a subdivision of the formation to be noticed; this consists of sandstones, nearly worthless for economic purposes, and of but little interest to the Palæontologist; they constitute the entire series of beds which underlie the limestones, and usually terminate downwards in Stonesfield slate, or have one or two beds which approach the slate in mineral character. These sandstones must be regarded as merely continuations of the Weatherstone beds, but are nearly or quite destitute of shelly detritus and crystalline structure; for it is a curious but undoubted fact that the shelly weatherstones never have the limestones incumbent upon them. All the quarrymen are aware of the fact from the experience which they have gained in the numerous trials for weatherstone. At Bussage an instance may be seen of a weatherstone quarry passing into a worthless sandstone on approaching the area covered by the limestone; occasionally, indeed, the sandstones disclose a cluster of *Pholadomyæ*, and in the vicinity of the Stonesfield slate contain some other bivalves which are never found in the shelly beds. Occasionally over some small areas good serviceable quarries of weatherstone are worked in situations where scarcely a single perfect shell can be procured; there is then a dense, finely comminuted, shelly detritus, and the rock abounds with calcareous spar, and becomes thick bedded; several quarries of this description have been worked in the parish of Avening with good success; in this condition the rock presents an exact counterpart to the *general* aspect of the freestone beds in the middle portion of the Inferior Oolite in Gloucestershire, except that perhaps in the latter formation the oolitic grains are rather more abundant.

One of the most forcible impressions conveyed to the mind by a survey of the testacea of this formation, when compared with that of the other members of the oolitic system, is the great scarcity of the Cephalopoda, so few indeed are they, that the entire number procured during the last twelve years may almost be counted. For this scarcity we think we can perceive a compensation in the appearance of several genera of zoophagous gasteropods, in such numbers as must effectually have checked any undue predominance which might have been acquired by the phytophagous mollusca, in the absence of the Cephalopoda. When the *Phasianellæ* and *Naticæ*, which are now known to be zoophagous, are added to our species of flesh-eating mollusca, it will at once be perceived how amply nature provided for the maintenance of the balance of the testaceous animals during the deposition of the Great Oolite of England. The great mass of the testacea are bivalves, and in species they exceed, by about one fourth, the united number of the Gasteropoda, Cephalopoda, and Echinodermata.



## SUB-KINGDOM—MOLLUSCA.

CLASS—CEPHALOPODA. *Cuvier.*CEPHALOPODES, *Lamarck*; *Férussac.*CEPHALOPHORES, *De Blainville.*

The remains of the Cephalopodous mollusca may generally be considered of extreme rarity in the Great Oolite, in proportion to their abundance in the Inferior Oolite, and Lias below, and the Kelloway rock and Oxford clay above that formation. Limited, however, as the numbers were of the class at this particular period, the two principal orders into which naturalists have divided the Cephalopoda, viz., the Dibranchiata and Tetrabranchiata, were at that time fairly represented in the Nautilus, Ammonite, and Belemnite, the two latter genera being well known as typical and characteristic of the secondary period of geologic history.

Class. <sup>1</sup>	Order.	Group.	Family.	Genus.
Cephalopoda.	Dibranchiata.	Oigopsidæ.	Belemnitidæ.	Belemnites.
	(Acetabulifera, D'Orb.)			
	Tetrabranchiata.	{	Nautilidæ.	Nautilus.
	(Tentaculifera, D'Orb.)		Ammonitidæ.	Ammonites.

ORDER — DIBRANCHIATA. *Owen.*

## Family—BELEMNITIDÆ.

BELEMNITES, *Ehrhart*, 1727. *Lam.*, *Blainv.*, *Voltz*, *D'Orb.*, &c.NAUTILUS BELEMNITA, *Gmelin.*ACAMAS, ACHELOIS, CALLIRHOË, CETOCIS, CHRYSABOR, HIBOLITHES, PACLITES,  
PORODRAGUS, THALAMUS, *De Montfort*, 1808.NOTOSIPHITES, GASTROSIPHITES, *Dural.*BELEMNITES, PSEUDOBELUS, *Blainville*, 1827.BELEMNITA, *Fleming*, 1828.

An elongated, conical, or fusiform body, of a radiated fibrous structure (the *osselet*, or *guard*), solid posteriorly, and more or less pointed (the *rostrum*); anteriorly pro-

<sup>1</sup> For a concise and interesting account of the general characters and classification of the Cephalopoda, the reader is referred to a previous Monograph, by Mr. F. Edwards, 'On the Eocene Mollusca,' Part I, Cephalopoda.

duced, truncated and furnished with a deep conical cavity (the *alveolus*), containing the distal portion of a horny or fibro-calcareous chambered shell (the *phragmacone*), perforated on the ventral part by a marginal siphuncle, and from the dorso-lateral margins of the anterior extremity of which shell proceed two elongated, slender, testaceous processes; the whole body being invested with a thin, testaceous, or corneo-calcareous integument (the *capsule*, or *periostricum*).<sup>1</sup>

<sup>1</sup> On the subject of the Belemnite and allied forms, the reader is referred to the Memoir by Professor Owen, in the 'Phil. Trans.,' 1844, p. 65; and the interesting papers in the same work, by G. A. Mantell, Esq., LL.D., 'Phil. Trans.,' 1848, p. 171, and 1850, p. 393; also to the 'Paleontologie Française, Terrains Jurassiques,' p. 40, by M. A. D'Orbigny.

In corroboration of the interesting facts cited by Dr. Mantell, respecting the continuation of the phragmacone of the Belemnite, we quote the following graphic statement of a writer of the last century as bearing on the subject. The remarks are contained in an account descriptive of the sinking of a well at Montbard, in 1774.

"There were, moreover, great numbers of Belemnites, all conical, the largest being from 7 to 8 inches long. They were pointed like an arrow at one end, and the other terminated irregularly, and was flattened, as if they had been crushed. They were brown, both on the outside and inside, and were formed of a material, arranged internally in transverse or radiating striæ, which met at the axis of the Belemnite. This axis was, in all, rather eccentric, and marked from one extremity to the other by a fine white line. Whenever the Belemnite attained a certain size, the base contained a small cone, more or less long, made up of cells, in the form of plates set one within the other (as in Nautili). The white line ended at the summit of the cone. This small cone was invested along its whole length by a yellowish crustaceous pellicle, extremely thin, although composed of several layers; and the body of the Belemnite (with a radiating structure), which enclosed the whole, became thin in proportion as the diameter of the cone increased. Such, generally, was the character of the Belemnites which were found mingled with the soil thrown out of the shaft, and which character is common to all those of this species. In order to ascertain the position which the Belemnites occupied in the beds, several portions were softened carefully, and it was found that they all laid flat, and parallel with the beds. What most astonished us, and what has not hitherto been noticed, was this, that we then perceived, that to the extremity of the base of all the Belemnites, was attached an appendage of a yellowish colour, composed of a substance like that of the shells, and which was shaped like the widened part of a funnel which had been flattened. Many of these were two inches long, one inch broad at the further end, and about six lines at the point where they were attached to the Belemnite. In examining closely this shelly or crustaceous prolongation (which was so delicate that it could scarcely be touched without breaking), I observed that this part of the Belemnite, which has not hitherto been recognised, is nothing more than the continuation of the thin shell or crust which covers the little chambered cone, of which I have already spoken; so that it may be said, that all Belemnites which are at present to be found in collections of Natural History are imperfect; and that the portion we are acquainted with is only, as it were, the case or covering of a portion of the shell which at one time enclosed the animal."

Buffon, 'Epochs de la Nature,' iii, Epoch 5, p. 143.

'Historie des Mineraux, des argiles et de glaises,' vi, p. 122.

The above passage is translated from the 'Explication de la Carte Geologique de France,' tom. 2, p. 350.

BELEMNITES FUSIFORMIS, *Park.* Plate I, figs. 6, 8.BELEMNITES FUSIFORMIS, *Park.* Org. Rem. iii, p. 127, t. 8, f. 13, 1811.— — *Miller.* Geol. Trans., 2d Series, ii, p. 61, t. 8, f. 22, t. 9, figs. 5, 7.— — *Brown.* Illust. Foss. Conch., p. 41, t. 29, f. 14.— — *Flem.* Brit. Anim., p. 240.— FLEURIAUSUS, *D'Orb.* Pal. Franç. Terr. Jur., p. 11, t. 13, figs. 14-18.— — *Buckman.* Geol. of Chelt., t. 3, f. 9.

*B. Testá elongatá, gracili, anticè compressá, attenuatá, posticè depressá, acutissimá subtus longitudinaliter sulcatá, sulco posticè, anticèque non interrupto; aperturá compressá.* (D'Orb.)

An elongated, smooth, somewhat fusiform Belemnite, somewhat compressed anteriorly, and depressed posteriorly, terminating in a rather sharp point; marked throughout the whole length by a deep single uninterrupted furrow, slightly enlarged towards the point of the rostrum. Alveolar cavity occupying about a fourth of the length. There is some slight confusion respecting this species, which is undoubtedly the shell alluded to by Parkinson in the work above cited, and described by Miller as coming from the Stonesfield slate, near Woodstock. The specimens figured (Pl. I, figs. 6—8), are from that locality. It appears also to be identical with the *B. Fleuriausius*, D'Orb., which is found in the Great Oolite in the environs of Luçon (Vendée). We are further confirmed in this opinion by the fact that Professor Buckman has identified and figured, in the work above referred to, a Belemnite under the name of *B. Fleuriausius*, as occurring in the Stonesfield slate of Gloucestershire, which is identical with our shell from the same deposit in Oxfordshire, the latter being the original locality from which the species was first obtained. The confusion appears to have arisen from the English specimens having been confounded with the *B. hastatus*, Blainville (*Hibolithes*, Montfort), from the Oxford clay, at least it is so quoted by M. D'Orbigny ('Pal. Franc. Terr. Jur.' p. 121), and also by Bronn ('Index Palaeontolog.', p. 156), an opinion that Mr. Miller may possibly have induced, inasmuch as he also considered De Montfort's species to be synonymous with the *B. fusiformis*.

*Locality.* The Stonesfield slate of Stonesfield; and Eyeford near Cheltenham.

BELEMNITES BESSINUS, *D'Orb.* Plate I, figs. 5, 7.BELEMNITES BESSINUS, *D'Orb.* Pal. Franç. Terr. Jur., p. 111, t. 13, f. 14-18.— CANALICULATUS, *Buckman.* Geol. of Chelt., p. 71, t. 3, fig. 8.

*B. Testá elongatá, anticè compressá, posticè depressá, subtus longitudinaliter sulcatá, sulco posticè interrupto, aperturá compressá.* (D'Orb.)

An elongated, smooth, very slightly fusiform shell anteriorly compressed, posteriorly depressed, marked throughout the whole length by a furrow which is wider, and slightly divided towards the point.



The specimen figured appears to be the same as the *B. Bessinus*, D'Orb., from the Inferior Oolite of Port-en-Bessin (Calvados) ; the general proportions are similar, about eight times as long as wide, and the division of the furrow may be faintly traced in some specimens. It is probably identical with the shell figured by Professor Buckman (loc. cit.) as *B. canalicatus*, Schlot., but that species is stated by M. D'Orbigny to have an equally impressed furrow, whereas, in our specimens, it is always expanded towards the point of the rostrum.

*Locality.* The Stonesfield slate of Stonesfield, and Sevenhampton near Cheltenham.

# ORDER—TETRABRANCHIATA. *Owen.*

## *Family*—NAUTILIDÆ.

### NAUTILUS, *Linnæus.*

BISIPHITES, OCEANUS, *De Montfort.*

OMPHALIA, *De Haan.*

NAUTILITES, *Schlotheim.*

A discoidal, convoluted, multilocular shell, compressed or ventricose, with contiguous volutions, the last one generally concealing the others, septa transverse, concave, and sometimes sinuous, with entire margins, more or less centrally perforated in their disc.

NAUTILUS DISPANSUS. Plate II, figs. 5, 5a.

*N. Testá subglobosá, latè umbilicatá, anfractibus rotundatis, lateraliter subearinatis : aperturá dilatatá, subovali ; septis (?) , siphunculo (?) .*

A somewhat globose and smooth shell, with rapidly increasing volutions, and a large and rather deep umbilicus, exposing the previous volutions ; umbilicus occupying about one third of the diameter of the shell ; volutions rounded on the back, and slightly carinated towards the base by the obliquely flattened form of the outer margin of the umbilicus. Aperture expanded, arched, semi-ovate, wider than high.

Septa and Siphuncle not visible in the specimen described.

Diameter of the aperture	.	.	.	6½inches
Height of the „	.	.	.	3½ „
Volutions increase in size (increasing about $\frac{2}{3}$ in the				
volution), from	.	.	.	2¼ to 6½ in.
Height of re-entering volution	.	.	.	1 „

This species is closely related to *N. excavatus*, Sow., ‘Min. Con.’ tab. 529, f. 1, from the Inferior Oolite of Dorsetshire ; but it is readily distinguished from it by the more oval form of the aperture ; the width of the umbilical opening, in proportion to the diameter, is also

different, being in *N. dispansus* about one third, and in *N. excavatus* about the half of the diameter of the shell; the form also of the umbilical cavity varies in the two species; in *N. excavatus*, the sides of the cavity are regularly conical, as shown in Mr. Sowerby's figure, above quoted, and in the 'Pal. Fran. Terrains Jurassiques,' t. 30; in *N. dispansus* the outer margin of the umbilicus is obliquely flattened, or subconical, the inner side being rather steep.

A single specimen only has been found of this species in the shelly beds of the Great Oolite near Minchinhampton.

NAUTILUS BABERI. Plate I, figs. 1, 1a.

*N. Testá discoideá, compressá, lævigatá, subumbilicatá; anfractibus angulatis, compressis; aperturá compressá subquadrata; septis vix sinuosis; siphunculo (?)*

A compressed, smooth shell, or only slightly marked by the lines of growth, with angular embracing volutions, leaving but a faint trace of an umbilical cavity; aperture somewhat quadrilateral, narrowed above, and wider than it is long; the septa are slightly sinuous, curving towards the umbilicus and outer margin.

This species is allied to *N. truncatus*, Sow., from the Lias, but is distinguished by the form of the mouth, and character of the septa.

*Locality.* Great Oolite near Minchinhampton.

We have much pleasure in dedicating this species to our friend, James Baber, Esq., of Knightsbridge, whose interesting collection of fossil remains is always liberally opened to public view.

NAUTILUS SUBTRUNCATUS. Plate I, figs. 2, 2a.

*N. Testá discoideá, inflatá, lævigatá, sulcatá, subimperfocatá; anfractibus rotundatis (jun.), subangulatis (adultá); aperturá depressá, subquadrata; septis (?), siphunculo (?).*

A smooth, or slightly furrowed, and somewhat inflated shell, with rounded and embracing volutions in the young state, which become truncate, or subquadrate, in the adult, and having a very shallow, or slightly impressed, umbilicus. Aperture about twice as wide as it is high, flattened above, and somewhat compressed laterally.

This shell has the general form of the *N. latidorsatus*, D'Orb. 'Terr. Jur.' t. 24, but the broad umbilicus and more quadrate form of the young shell in that species readily distinguish them. This species belongs to the section of imperforate Nautili, of which *N. truncatus*, Sow., *N. clausus*, D'Orb., are examples; a group, the species of which were not apparently very numerous during the Jurassic period.

*Locality.* Great Oolite near Minchinhampton.



## ORDER—TETRABRANCHIATA.

*Family*—AMMONITIDÆ.AMMONITES, *Brugiere*. 1789.OPHIOPOMORPHITES, *Plott*.PLANORBITES, ORBULITES, GLOBITES, PLANULITES, *Lam*.AMALTHEUS, PLANULITES, *De Montfort*.PLANITES, GLOBITES, *De Haan*.NAUTILUS, ARGONAUTA, *Reinecke*.AMMONITA, ORBULITA (pars.), *Fleming*.

A more or less discoidal, multilocular shell, with contiguous volutions; volutions generally visible, septa transverse, with sinuated edges, perforated by a single tube, situated close to the outer margin.

AMMONITES SUB-CONTRACTUS. Plate II, figs. 1, 1a, jun., figs. 2, 2a.

*A. Testá discoideá, subglobosá, costatá, umbilicatá, anfractibus involutis, rotundatis compressis, lateribus 16—18 costatis, costis obtusis bi-trifurcatis, in dorsum continuis; aperturá semiellipticá subcontractá; umbilico magno, excavato, subconica.*

A sub-globose, deeply umbilicated, and costated shell, with sixteen to eighteen obtuse ridges (tubercles?) surrounding the margin of the umbilical cavity, from each of which three or four smaller costæ pass over the somewhat depressed and rounded back. Aperture, semi-elliptical.

Proportion of umbilicus to diameter, rather more than one-half. Diameter, 5 inches. Thickness, 3 inches. Height of aperture,  $1\frac{1}{2}$  inches, twice as wide as it is high.

The specimen from which our figure is taken has been much worn by clearing it from the original matrix, but a careful examination discloses the prominent marginal costæ, as well as the smaller ones which arise from them and pass over the back.

In the umbilicus, the marginal costæ are well exhibited, which in the young state were more compressed, and continued on the inner side of the cavity.

This species is distinguished from the *Ammon. coronatus*, Brug., by its more globose form, less conical umbilicus, and the more arched and less expanded aperture. It is closely allied to *Am. contractus*, Sow., and in a young state might be mistaken for that species; but the ribs are larger and not so numerous or elevated; the less embracing volutions, and the more contracted form of the aperture in the adult shell, are also characters by which it may be distinguished.

Unfortunately the determination of the species, and their varieties of the Ammonites in the Great Oolite of Minchinhampton, is rendered extremely difficult, in consequence of the great rarity of specimens, and their state of preservation, rarely allowing the least trace of the sinuated edges of the septa to be observed.

AMMONITES ARBUSTIGERUS, *D'Orb.* Plate II, figs. 4, 4a.AMMONITES ARBUSTIGERUS, *D'Orb.* 1848. Pal. Franç., Terr. Jur., p. 414, t. 143.— — — *D'Orb.* 1850. Prod. Paléont., p. 296.

*A. Testá compressá, anfractibus rotundatis, latis, lateribus convexis transversim 22 costatis; costis obtusis bi-trifurcatis vel intermediis, dorso sub-convezo; aperturá oblongá, compressá.*

A discoidal, costated shell, with somewhat convex and gradually increasing volutions; umbilicus large: the principal costæ are obtusely rounded, and about twenty-two in number, bifurcating as they pass over the back, having occasionally an intermediate rib; back convex; aperture oblong.

*Locality.* In the Great Oolite of Minchinhampton, and described by M. D'Orbigny as occurring both in the Great and Inferior Oolite of Normandy.

AMMONITES MACROCEPHALUS, *Schloth.*, var. Plate II, figs. 3, 3a.AMMONITES MACROCEPHALUS, *Schloth.* 1813. Min. Tasch. vii, p. 70.— — — *Schloth.* 1820. Petref., p. 70, No. 16.— — — *Zieten.* 1830. Pet. Wurtemberg, t. 5, f. 1, 4.— — — *D'Orbigny.* 1848. Pal. Franç. Terr. Jur., p. 430, t. 151.— — — *D'Orbigny.* 1850. Prod. Paléont., p. 127.

*A. Testá discoideá, sub-globosá, anfractibus involutis, rotundatis, costatis: costis 20—30 obtusis, medio laterum bifurcatis; aperturá semi-ellipticá; umbilico subcontracto.*

An inflated, or somewhat globose shell, with rather depressed volutions, and a narrow and deep umbilicus, from the margin of which arise about twenty to thirty obtuse ribs, which bifurcate in passing over the back. Back convex; aperture semi-elliptical.

We have ventured to assign our specimens to the *Ammonites macrocephalus* of Schlotheim, although their imperfect state of preservation renders this identification somewhat doubtful. The specimens of this species hitherto obtained by us from the Oolite, are always in the state of casts, and very much eroded, so that the principal ribs which surround the umbilical cavity, are nearly obliterated, as shown in the figure, tab. 2, fig. 3.

*Locality.* Great Oolite near Minchinhampton.

AMMONITES GRACILIS, *Buckman.* Plate I, figs. 3, 3a.AMMONITES GRACILIS, *Buckman.* 1845. Geol. of Chelt., p. 104, t. 3, fig. 6.

*A. Testá discoideá, compressá, anfractibus ovatis lateribus sub-complanatis, transversim 30—40 costatis; costis bi-trifurcatis vel intermediis, in dorsum continuis, aperturá ovatá, sub-sagittatá.*

A discoidal, compressed, ribbed Ammonite, with six to eight oval, slowly increasing



volution, the last formed partly concealing the previous ones, with about thirty to forty rounded or obtuse and nearly straight ribs on the inner margin, which generally become bi- or trifurcate about the middle of the volution, and some pass over the back, giving it a costated appearance; the ribs, however, are not always confluent, an intermediate one frequently arising about the middle of the volution; from the manner in which each volution is enveloped, the previous ones only exhibit the simple costæ, as seen in the specimen figured at Tab. I, fig. 3. The aperture is semi-ovate and compressed. The sinuosities of the septa are not to be traced with any degree of accuracy, but they appear generally to resemble those indicated by D'Orbigny. 'Terr. Jurass.,' t. 148. (*Am. Bakeriæ*.)

Differing as our figure<sup>1</sup> does from that given by Prof. Buckman in the 'Geology of Cheltenham,' we have no doubt of the identity of the specimens, having been enabled through the kindness of that gentleman, to compare the original form. All the specimens we have examined of this species are more or less compressed, and this cause may have partly influenced the peculiar saggitate form of the aperture in the individual shell selected by Prof. Buckman for illustration.

The costæ which ornament this shell in the young state, and for a considerable period of its growth, become partially obsolete in a more advanced stage. Perfect specimens of this shell, showing the fact, are excessively rare, but we have collected large fragments of this species on Sevenhampton common, in which the character is clearly exhibited.

*Locality.* The specimen figured is in the collection of James Baber, Esq. F.G.S., and was obtained from the Stonesfield slate of Stonesfield. It also occurs in the same formation at Sevenhampton common.

AMMONITES WATERHOUSEI. Plate I, figs. 4, 4a.

AMMONITES DISCUS, D'Orb. Terr. Jurass., p. 394, t. 131.

— — D'Orb. Prod. Paléont., p. 296. 1850.

*A. Testá compressá, sub-carinátá, anfractibus compressis, latis, externè angulatis; lævigatis; dorso acuto; umbilico angustato; aperturá sagittatá.*

A compressed, discoidal shell, formed of very compressed and nearly embracing volution; the inner half of the shell flattened and smooth; the outer, with obtuse, rather distant and flexuous costæ, terminating near the margin; keel acute; mouth sagittate.

This specimen, from the Great Oolite of Minchinhampton, agrees in all the characters with the *Am. discus*, figured and described by M. D'Orbigny, 'Terr. Jurass.,' pl. 131, and

<sup>1</sup> Unfortunately the specimen figured illustrates only the young state or inner volution of this species, not having received at that time the finer specimens belonging to Professor Buckman, and from which the following description was drawn up: "*A. gracilis*. Keel crenated; volution six or seven, half concealed; ribs straight, passing over the back, and thus making the crenations of the keel; sometimes two or three ribs are confluent towards the front; diameter about 9 inches; thickness  $1\frac{1}{4}$  inches; aperture sagittate." (Geol. of Chelt., p. 104.)

which is cited by that author as occurring both in the Great and Inferior Oolite of Normandy. We also possess the same species from the Inferior Oolite of Bridport and Gloucestershire. It differs, however, essentially from the original specimen of *Am. discus*, Sow., described in the 'Min. Conch.,' tab. 12, which has a more regular, sagittate aperture, and does not possess the central flattened space, so characteristic of our species.

*Locality.* Great Oolite of Minchinhampton, *Lycett*. In the same formation at Ranville (Calvados), Niort (Deux Sèvres), Mansigny (Vendée), *D'Orbigny*. In the Inferior Oolite at Bridport, and near Stroud; Eterville and Moutiers (Calvados).

We have much pleasure in assigning to this species the name of G. R. Waterhouse, Esq., whose arrangement and careful study of the Cephalopoda, contained in the National Collection, have materially assisted this branch of Palæontology.

## CLASS—GASTEROPODA. *Cuvier*.

### ORDER—PROSOBRANCHIATA. *M. Edwards*.

CTENOBRANCHIATA, *Schweigger*.

*Family*—STROMBIDÆ.

PTEROCERA, *Lamarck*, 1801.

Shell turritid, ventricose, spire usually short, aperture oval, having a lengthened canal at both extremities, outer lip expanded into hollow thickened spines, with an anterior sinus separate from the caudal canal.

### PTEROCERA IGNOBILIS. Plate III, fig. 14.

*P. Testá parvá turbinatá; spirá breviusculá; anfractibus lævigatis, planatis (3—4) ultimo obsoletè transversim bicarinato; carinâ superiori obsoletè nodosá; caudá brevi.*

Shell small, turbinated, spire short, whorls smooth, flattened (3—4), the last whorl twice carinated, the upper carina obscurely nodulous, canal short.

The great breadth of the whorls, and the obscurely bicarinated last whorl, are the leading features. This shell approaches *Alaria lævigata*; but in that species the spire is much more lengthened, and the volutions do not become angular, until at least five have been completed, it then produces small processes, which are deciduous, and the last whorl does not attain any undue magnitude; but, in the species before us, the fourth volution is large, has considerable squareness, but with scarcely any distinct carina.

*Locality.* Rare in the planking of Minchinhampton Common.



PTEROCERA BENTLEYI. Plate III, figs. 15, 15a, var. fig. 16.

*P. Testá turritá, anfractibus convexis, costis transversalibus (4); anfractu ultimo permagno, et costato; labio externo palmato digitis quinque divaricatis; canali obliquo elongato.*

Shell turrited, turbinated, whorls convex, costated, costæ (4) transverse, last whorl very large and costated, the costæ terminate in an expanded palmated wing, digitations five in number, beneath which are numerous diverging lines which connect the wing with the caudal extremity.

The whorls are oblique in their upper and cylindrical in their lower portions; their encircling ribs are unequal and irregular; no other markings are preserved; but the condition of the specimens is scarcely so good as could be wished. The wing is enormously expanded; the spines extend a little beyond the connecting portions of the wing.

*Locality.* The Stonesfield slate at Collyweston has furnished the present specimens. The specific name in compliment to John F. Bentley, Esq., of Stamford, who has enriched our knowledge of the fossils of that locality.

ALARIA. *Nov. Gen.*

*A. Testá turritá, alatá et caudatá, alá integrá vel digitatá, interdum varicem formanti; canali posteriori nullo, labro sinistro tenui, nunquam calloso nec anfractum ultimum obtigenti, labro dextro interdum ultra anfractum ultimum extenso, canali anteriori producto aut breviusculo.*

Shell turrited, winged, and with a caudal extremity, wing entire or digitated, sometimes produced into a thickening or varix, no posterior canal, left lip thin, never thickened, nor extended upon the penultimate whorl, right lip sometimes extended slightly upon the penultimate volution, anterior canal either produced and lengthened or short.

This genus is constituted to receive a numerous group of winged shells, which are separated from the true Strombidæ, Rostellarie, and Pteroceræ by a simple but important distinctive character, viz. the absence of a posterior channel upon the spire. The greater number of our Great Oolite species of Strombidæ will be found to range themselves under this division of the family; the character of the wing is various, consisting either of a simple, undivided, and thickened process, or divided into two or more digitations; the channel, likewise, may be either short and straight, or lengthened and curved; the inner lip is always thin—usually effuse and scarcely visible, but never produced into a thickened posterior ridge, as in the true Rostellarie; the wing, in some instances, is extended slightly upon the penultimate volution, which is its utmost limit.

Another character of some importance, first noticed by Mons. Deslongchamps, and which appears to characterise this group of shells, is this: the animal, after having developed the right margin of the shell, continued to increase in growth, and (like the species of *Murex* and *Ranella*) reproduced a second dilated and digitated margin, similar

to the first, and generally opposite to it, a character rarely if ever found in the recent Pteroceræ or Rostellariæ.<sup>1</sup>

ALARIA ARMATA. Plate III, fig. 1, 1a.

*A. Testâ turritâ, anfractibus carinatis, et angulato-nodosis, nodis prominentibus 6 in ambitu. Anfractu ultimo gibbo, bicarinato; carinâ superiori prominentiori spinis acutis; in ætate juniore digitis tribus parvis; in ætate adultâ digitis superioribus duobus longissimus. Caudâ longâ curvatâ. Striis tenuissimis confertis transversis, plerumque obsoletis.*

Shell turrited, whorls carinated, angulated and carinated in their middle portion; nodules 6 in a volution. The last whorl has three carinæ, the last of which is nearly obsolete. In the young state it has three small digitations; when adult, the two superior carinæ are extended into very long digitations; the first carina having two angular prominences or spines. The entire surface of the shell has numerous fine encircling striæ, which for the most part are indistinct.

The acute spine, number of whorls, their prominently angular figure, together with the spine upon the middle of the superior carina of the last whorl, are characteristic features; from *A. hamus* and *A. Phillipsii* the character of the wing is sufficient to distinguish it.

*Locality.* The planking beds of Minchinhampton Common have furnished all our specimens; the coarse character of the deposit rarely allows the display of the fine striæ, or other features of much delicacy. It is moderately rare.

ALARIA HAMUS, *Desl.* sp. Plate III, figs. 2, 2a, 2b.

ROSTELLARIA HAMUS, *Deslongchamps*. 1842. *Mém. Soc. Linn. Normandie*, vol. vii, p. 173, pl. 9, figs. 32, 33, 34, 35, 36.

— — — *Desh.* *Lam. An. sans Vert.*, 2d Edit., 1843, tom. 9, p. 666.

PTEROCERA HAMUS, *D'Orb.* 1850. *Prod. Paléont.* p. 270.

*A. Testa turritâ, anfractibus transversè striatis, medio angulato-nodulosis, nodulis plus minusve crebris, ultimo anfractu gibbo, bicarinato, carinâ superiori majori; aperturâ trigonâ. Carinâ majore ultimo anfractu nodulosa, nodulis parvis, subobsoletis.* (*Deslongchamps*.)

Shell turrited, whorls transversely striated, having a circle of nodules somewhat angulated in their middle part, the nodules being more or less closely arranged. The last whorl is large; it has two carinæ, the first of which is much the larger, and is indented or formed into closely arranged nodules, which are sometimes nearly obsolete.

In some specimens, the larger carina is quite smooth, in others the indentations are oblique; the canal is short and straight.

<sup>1</sup> *Mém. Soc. Linn. de Normandie*, vii, p. 171, 176. *Lam. Anim. sans Vert.*, 2d Edit., p. 671.



*Locality.* The planking of Minchinhampton Common and white stone of Bussage contain it; but at the latter place the more delicate features are usually best preserved. It is rather rare. Inf. Oolite, Bayeux; Great Oolite, Ranville, Normandy. (*Desl.*)

**ALARIA LÆVIGATA.** Plate III, fig. 3, 3a.

*A. Testá fusiformi, anfractibus convexis, lævigatis, ultimo bicarinato, carinâ superiori spinigera; spino oblongo ori opposito; alâ brevissimâ in ætate juniore monodactylâ, dein (ætate adulta) magnâ didactylâ, digitis longis divaricatis, tenuibus, trigonis; caudâ longâ, rectâ, apice sub-incurvo; aperturâ oblongâ, labro sinistro subcalloso.*

Shell fusiform, whorls convex, smooth, the last whorl with two carinæ, the upper carina spined; the spine oblong, and placed opposite to the aperture; the wing very small when young, at first it has but one digitation, with advance of growth it acquires two large digitations, which diverge in opposite directions, they are smooth and three-sided; the caudal extremity is long and curved towards the apex; the aperture is oblong, the left lip being slightly thickened.

In everything, excepting its smooth surface, this shell agrees with the *Rostellaria myurus* of Deslongchamps; but as we have seen about twelve specimens, which were well preserved, it is impossible that they ever could have had the striæ which distinguish the shell from Normandy.

*Locality.* It is rare, and has been found only in the planking of Minchinhampton Common and contemporaneous beds of white stone north of the Vale of Brimscombe.

**ALARIA HAMULUS,** *Desl. sp.* Plate III, figs. 4, 4a, 4b.

ROSTELLARIA HAMULUS, *Deslongchamps.* Mém. Soc. Linn. Normandie, vol. vii, p. 175, pl. 9, figs. 37—40.

— — *Desl.* Lam. An. sans Vert., 1843, tom. 9, p. 666.

PTEROCERA HAMULUS, *D'Orb.* Prod. Paléont., p. 302.

*A. Testá parvâ turritâ, apice obtuso, anfractibus (5—6) carinatis nodulosis; ultimo anfractu subgibbo, transversè striato; striis inæqualibus, majoribus alternatim minoribusque; carinâ nodulosâ seu plicatâ; labro externo incrassato variculam simulante; alâ parvâ unidigitato, apicè acuto trigono, subtùs canaliculato; caudâ brevissimâ, aperturâ subellipticâ.*

Shell small, turrited, clavate, apex obtuse, whorls (5—6) convex, nodulated, nodules six in a volution. The last whorl has a single nodulated carina terminating anteriorly in a slight digitation. In the immature state the digitation is produced into a hook-shaped process. The surface has numerous encircling striæ, somewhat irregular, but which are alternately large and small. The upper margin of each whorl has a prominent line closely tuberculated; the aperture is narrow, being contracted on the right side by a thickened

fold or varix, of which there are two upon the last volution. The inner lip is broad and distinct, the channel is short and straight. A small canal passes from the aperture to the apex of the rudimentary digitation.

M. Deslongchamps has described this species from three small specimens, which are very imperfect, having only the last volution. The name is scarcely appropriate to full-grown individuals which nearly lose the hook-like digitation: in one instance only have we noticed the *hamulus* of the dimensions figured by M. Deslongchamps, and this occurred in the smallest of our specimens, which was but little larger than the Norman one. It would, therefore, seem that this feature was of an uncertain character, and disappeared at a later period of growth.

*Locality.* The beds of planking at Minchinhampton Common, and their equivalents, the white stone of Bussage and Eastcombs, have supplied all the specimens which have come to our knowledge. It is not very rare. In the Great Oolite (*pierre blanche*), Langrune, Normandy. (*Desl.*)

ALABIA PHILLIPSII, *D'Orb.* sp. Plate III, figs. 5, 5a.

PTEROCERA PHILLIPSII, *D'Orb.* 1850. Prod. Paléont, p. 270.

ROSTELLARIA COMPOSITA, *Phil.* 1835. Geol. Yorksh., i, t. 9, fig 28, (not Sow.)

*A. Testá turritá; spirá elongatá; anfractibus numerosis, convexis, vel subangulatis, transversè striatis, et costis obliquis numerosis approximatis; anfractu ultimo bicarinato; alá unidigito, caudá rectá, breviusculá.*

Shell turrited; spire elongated; whorls numerous, convex, or subangulated, transversely striated, and ornamented with numerous closely-arranged oblique ribs upon the lower half of each whorl; the last whorl is striated and bicarinated, terminating in a simple or undivided wing; the caudal extremity is straight, smooth, and of moderate length. *A. hamus* is the species which approximates most nearly to it; but in that shell the longitudinal costæ are less numerous, not oblique, and are visible throughout the length of the whorl; whereas in the *A. Phillipsii* they occupy the lower half only, and form an angle at their upper termination. The upper and larger carina upon the last whorl is more smooth and less prominent than in the *A. hamus*, and the entire form of the shell more lengthened or slender.

*Locality.* Scarborough, in dark chocolate-coloured argillaceous shale. Great Oolite, (*Phillips.*)

ALABIA PAGODA. Plate III, fig. 6.

*Testá turritá; anfractibus numerosis, in medio carinato-crenatis, ultimo bicarinato; carinis tuberculatis; anfractibus transversè striatis; striis duabus prominentibus suturam*



*approximantibus. Alá magná, expansá, in digitos duobus productá, digitis parvis, caudá brevissimá.*

Shell turritid; whorls numerous, each with an acute mesial carina, the last whorl with two carinæ; the edges of the carina undulate and are nodulated; the whorls are transversely striated above the carina; beneath are two prominent striae, bordering the suture; wing large and expanded, extended into digitations; the digitations are small, the caudal termination very short.

This elegant shell possesses a certain family resemblance, which places it near to several of our Great Oolite examples of the genus. The acute carina reminds us of *A. trifida*, the nodules of *A. hamus*, and the general figure of the wing and caudal extremity of *A. paradoxa*; the whorls are comparatively numerous and narrow, the mesial carina very prominent, and the junctions of the whorls strongly defined.

*Locality.* The white stone of Eastcombs has furnished our only example.

ALARIA ATRACTOIDES, *Desl.* sp. Plate III, figs. 7, 7a.

PTEROCERA ATRACTOIDES, *Deslongchamps.* Mém. Soc. Linn. de Normandie, vol. vii, p. 166, pl. 9, figs. 7, 8, 9.

— — *Desl.* Lam. An. sans Vert., 2d Edit., 1843, tom. 9, p. 681.  
— — *D'Orb.* Prod. Paléont., p. 302.

*A. "Testá fusiformi, transversim striatá; striis alternis altioribus; anfractibus bicarinatis (carina superiore majore) longitudinaliter plicato-nodosus, plicis remotiusculis, nodis quadratis, acutis, ultimo anfractu subgibbo; caudá longá, incurvâ."* (*Deslongchamps.*) *Alá expansá in digitis trigonis quatervis vel quinque (digito superiori majori).*

Shell fusiform, transversely striated; striae alternately elevated; whorls twice carinated (the upper carina being the largest), longitudinally nodulated and plicated; the plications remote, the nodules square and acute. The last whorl is large, the canal long and curved, the wing expanded, having four and perhaps five triangular digitations, of which the upper one is the largest.

We have three specimens of this rare shell, in one of which the wing is well developed, with the exception of the extremity of the lower digitation, which may be imperfect.

*Locality.* The planking beds of Minchinhampton Common. Great Oolite (*caillasse*), Ranville, Normandy. (*Desl.*)

ALARIA HEXAGONA. Plate III, fig. 8.

*A. Testá turritá; anfractibus paucis (4), angulatis et nodulosis; nodulis 6 hexagonis; ultimo anfractu unicarinato, nodulosa, varicem ori oppositum gerente. Alá parvâ, caudâ sublonga; aperturâ contractâ, ovatâ; labro sinistro tenui.*

Shell turritid; apex obtuse; whorls few (4), prominently angulated and nodulated;

nodules 6 in a volution, giving it a six-sided aspect. The last whorl has a single nodulated carina, which has a prominence placed opposite to the aperture. The wing seems to be but little produced, and is not divided into digitations. The canal is rather long and straight; the aperture ovate and contracted; the left lip thin.

This is a rare species, of which we have only seen about six specimens: all of these have been more or less imperfect, the wing being badly preserved, or wanting altogether.

*Locality.* The planking beds of Minchinhampton Common.

ALARIA PARADOXA, Desl. sp. Plate III, figs. 9, 10.

PTEROCERA PARADOXA, Deslongchamps. 1842. Mém. Soc. Linn. Normandie, vol. vii, p. 170, pl. 9, figs. 16—18, 20—22.

— — Desh. Lam. An. sans Vert., 2d Edit., 1843, tom. 9, p. 682.

— — D'Orb. 1850. Prod. Paléont., p. 302.

*A. Testá parvá ovatá; spirá breviusculá obtusá; anfractibus 7 angulato-nodosis, nodis remotiusculis; ultimo anfractu pluricostato, costis transversis subæquidistantibus, et inæqualibus; caudá brevi, rectá; alá angustá, varicem simulante, pluri-dentatá, dentibus inæqualibus subtùs canaliculatis, aperturá angustatá, varicem formante.*

Shell small, ovate; spire moderately elevated, obtuse; whorls angulated and nodulated, the nodules being distant, or about 7 in a volution. The last whorl has plain transverse ribs, nearly equidistant, and slightly unequal in size. The canal is short and straight; the wing is thickened into a kind of varix at the aperture, which is contracted.

The spire bears a larger proportion to the last whorl than appears in M. Deslongchamps' figures, which may be accounted for by his having restored the former portion from another specimen; exactness in such a case is not to be expected.

This species is comparatively rare. We have scarcely seen one which is perfect.

*Locality.* Great Oolite of Minchinhampton. Bath Oolite (*pierre blanche*), Langrune, Colleville, Normandy. (Deslongchamps.)

ALARIA PARADOXA, var. Plate III, fig. 9a.

Shell ovate; spire moderately elevated; whorls (6) convex, rendered angular by prominent tubercles, of which there are seven or eight in a volution; the last whorl is large, has numerous transverse ribs, of which two are more prominent; the ribs terminate in small digitations; there is also a large bifid spine placed opposite to the wing.

As compared with *A. paradoxa*, the spire is more elevated, and bears a larger proportion to the body whorl; the encircling ribs upon the last whorl are much more elevated and unequal, the two larger ones giving a kind of bicarinated aspect to it, and terminating in digitations, which are much larger than in the former shell. The large bifid spine upon

the opposite side of the whorl is another distinctive character. The caudal extremity is short and straight. Length, 10 lines; breadth, including digitations, 9 lines.

*Locality.* This species is found in all the shelly beds, but is far from common.

*ALARIA TRIFIDA*, *Phil.* sp. Plate III, figs. 11, 11*a*, 11*b*, 11*c*.

*ROSTELLARIA TRIFIDA*, *Phillips*. 1835. *Geol. of Yorksh.*, i, t. 5, fig. 4.

— *BISPINOSA*, *Phillips*. *Geol. of Yorksh.*, i, t. 4, fig. 32.

— *BICARINATA*, *Goldfuss*. *Petref.*, t. 170, fig. 1.

— *TRIFIDA*, *Deslongchamps*. *Mém. Soc. Linn. Normandie*, vol. vii, pl. 9, figs. 28, 29, 30, 31.

— — *Desh.* *Lam. An. sans Vert.*, 2d Edit., t. 9, p. 665.

*A.* “*Testá fusiformi, turrilatá, transversè striatá, anfractibus medio carinato-acutis; ultimo bicarinato, gibbo; alá didactylá, digitis in ætate adultá longissimis, recurvatis; in juniore modo unico, modo duobus inæqualibus digitis, seu inferiore, seu superiore longiore; caudá longissimá, recurvatá; aperturá angustatá.*” (*Deslongchamps*.)

Shell fusiform turreted, transversely striated; whorls acutely carinated about the middle part; the last whorl has two carinæ, the upper of which is most prominent, and has a prominence or spine opposite to the aperture. The wing is digitated; when full grown the digitations are very long and recurved, the larger being sometimes the upper, and at other times the lower digitation. In the young state it has only one carina and digitation. The canal is very long and recurved, the aperture small.

Having had the advantage of examining a large number of specimens, comprising every variety both in form and stage of growth, we feel no hesitation in uniting the two species here indicated. The whorls have every degree of angularity, specimens of *A. bispinosa* having the lower half of each volution simply cylindrical, the carina not projecting beyond it, and the first three or four whorls are smooth and simply convex, scarcely showing any trace of angularity. The extreme of the other variety has the carina not only angulated acutely, but spread out horizontally into a prominent tabular border.

The encircling striæ are equally variable. In some instances the striæ are regular and equal, but more frequently they are alternately large and small; at other times, however, they are altogether irregular and unequal.

*Locality.* This species occurs throughout the whole of the Great Oolite near Minchinhampton; even the upper beds, when shelly, not unfrequently contain it. Undoubtedly it is the most common example of the genus. In the Calcareous grit; Oxford Clay; Kelloway Rock, near Scarborough, Yorkshire (*Phillips*).

M. E. Deslongchamps describes this species as occurring throughout the jurassic series of Normandy, viz. the *Lias*, Fontaine-Etoupefour; *Inferior Oolite*, Bayeux; *Great Oolite*, Ranville; *Oxford Clay*, Vaches-Noires; *Kimmeridge Clay*, Villerville.



ALARIA PARVULA. Plate III, fig. 12*a*, 12*b*.

*A. Testá parvá, turritá; anfractibus quinque convexis, angustatis, lævibus, ultimo planato, striato; striis transversis, crebris, acutis, subcrenulatis; caudá brevissimá; alá—?*

Shell small, turreted, volutions (5) convex, narrow, smooth, the last volution flattened, striated, striæ transverse, closely arranged, acute, and slightly crenulated; the canal nearly obsolete; wing unknown.

*Locality.* The planking of Minchinhampton Common has furnished only one well-preserved specimen with which we are acquainted,—it does not exceed 6 lines in length; the whorls are very narrow and convex, the striæ being visible only upon the body whorl.

ALARIA? CIRRUS, *Desl.* sp. Plate III, figs. 13, 13*a*.

ROSTELLARIA CIRRUS, *Deslongchamps*. 1842. *Mém. Soc. Linn. Normandie*, vol. vii, p. 178, pl. 9, f. 26.

— — *Desl.* *Lam. An. sans Vert.*, 2d Edit., tom. 9, p. 668.

PTEROCERA CIRRUS, *D'Orb.* 1850. *Prod. Paléont.*, p. 302.

*A. Testá turritá, transversim striatá, apice acuminato; anfractibus medio carinatis, ultimo inflato, bicarinato; carinâ superiori eminentiori, gibbum transversè oblongum ori oppositum gerenti; alá brevissimá, in ætate juniore monodactylá, deinde (ætate progredienti) didactylá, digitis longis, divaricatis, tenuibus, trigonis. Caudá longissimá, rectá, apice incurvo.* (*Deslongchamps.*)

Shell turreted, apex pointed, transversely striated, whorls carinated in the middle, the last whorl inflated, having two carinæ; the first carina being the most prominent. A transverse prominence is placed opposite to the aperture; the canal is long and straight, except the extremity, which is curved.

A single specimen, in which the last whorl is imperfect, is all we have to refer to; the form, however, is unequivocal; the spire is unusually short and ventricose, as compared with other examples of the genus, and in the stage of growth which our specimen exhibits, had not acquired the large digitations and caudal extremity proper to a later period.

*Locality.* Minchinhampton Common; it must be referred to some of the shelly beds beneath the planking; rare. *Great Oolite*, Ranville, Normandy. (*Desl.*)

*Family*—MURICIDÆ.

FUSUS, *Lam.* 1801.

Shell fusiform or subfusiform, ventricose in the middle, with an elevated spire, volutions convex, generally costated or striated; aperture ovate, terminating anteriorly in a more or less elongated canal, outer lip entire, sharp; columella smooth.

**FUSUS MULTICOSTATUS.** Plate V, fig. 6, 6a.

*F. Testá parvá, turritá, turbinatá, anfractibus convexis (5—6), suturis profundè separatis; costis longitudinalibus numerosis, obliquis, striis transversis, crebris; aperturá parvá, caudá breviusculá.*

Shell small, turreted, turbinated; whorls very convex, 5—6 in number; the sutures being deeply impressed, the costæ are longitudinal, rounded, and directed obliquely from left to right; there are also numerous closely-arranged transverse striae; the aperture is small, the canal short.

*Locality.* The planking bed of Minchinhampton Common has afforded this pretty little species: it is moderately rare.

**FUSUS CORONATUS.** Plate V, fig. 5.

*F. Testá parvá, turritá, anfractibus convexis, angustatis et nodulosis (nodulis 9), parte superiori transversè trilineatis; anfractu ultimo ventricosus; basi lævi, caudá subrectá.*

Shell small, turreted, whorls convex, narrow, and nodulated; nodules about 9 in a volution, with three encircling lines beneath the middle of each volution; the last whorl is ventricose, the caudal extremity nearly straight.

The general aspect of this little species has some resemblance to a *Rostellaria*; there does not appear, however, to be any expanded wing or other characteristic features of that genus.

*Locality.* It is very rare. We have obtained only three specimens, which occurred in the planking of Minchinhampton Common.

**FUSUS? SUB NODULOSUS, D'Orb.** Plate V, fig. 9, 9a.

FUSUS SUBNODULOSUS, D'Orb. 1850. Prod. Paléont., p. 303.

— NODULOSUS, Deslongchamps. Mém. Soc. Linn. Normandie, vol. vii, pl. 10, figs. 36, 37. (Not Sow., 1837.) (Not Lamarck.)

*F. Testá minutá, ovato-turritá, acutá; anfractibus rotundato-inflatis, transversè striatis, nodulis (6) subobliquis, longitudinalibus; columellá marginatá, aperturá ovatá, caudá breviusculá.*

Shell minute, ovately turreted, acute; whorls rounded, tumid, transversely striated; nodules 6 in a volution, longitudinal, and rather oblique; columella marginated, aperture ovate, caudal extremity short; length, 3 lines.

The transverse striae are not mentioned by M. Deslongchamps; but in the specimen which we have figured they are very distinct.

*Locality.* It would appear to be very rare, and has been found only in the planking of Minchinhampton Common; but with this and other minute shells it is not easy to form an accurate notion of their actual numbers. In the Bath Oolite of Langrune, Normandy. (*Desl.*)

BRACHYTREMA. *Nov. Gen.*

FUSUS. *Species in part. Auct.*

The Great Oolite shells, which we have placed under this generic designation, present characters so much at variance with the received ideas of *Fusus*, that we have been induced to erect them into a new genus, under the name *Brachytrema*; the definition of this form, whether it be regarded as subdivision of *Fusus*, or as a distinct genus, is as follows:—

*B. Testá turritá, turbinatá; anfractibus convexis et costatis, nodulosis, aut cancellatis; labro dextro tenui; columellá rotundatá, lævi, ad basin contortá; canali brevi, obliquo.*

Shell small, turreted, turbinated; whorls either costated, nodulated, or cancellated; the last whorl large and ventricose; right lip thin and smooth; columella smooth, rounded, twisted near to the base, and reflecting outwards, forming a short oblique canal; aperture moderately large, subovate, its length being usually less than that of the spire.

The general figure of this genus is turbinated, and nearer to *Buccinum* than *Fusus*; it has, however, the base and channel of *Cerithium*; the short oblique canal and twisted columella separate it from *Fusus*, the genus to which the known species have most frequently been referred. The following forms may possibly be assigned to this genus:—*Murex haccanensis* of Phillips, the *Fusus carinatus* of Roemer, the *Triton buccinoideum*, the *Purpura filosa*, the *Murex versicostatus*, and the *Fusus corallensis* of Buvignier, and, probably, the *Fusus nassoides* and the *Fusus nodulosus* of Deslongchamps. All the species are small, the largest scarcely equalling 10 lines in length.

The *Fusus Thorenti* d'Archiac would appear at first sight to belong to this genus; but having examined the original specimens in the collection of Viscomte d'Archiac, we are inclined to believe that the figure in the 'Memoirs of the Geological Society of France' (vol. v, plate 30, fig. 5), is taken from an imperfect shell, which is closely allied to, if not identical with, the *Turbo pyramidalis* of the same author.

BRACHYTREMA BUVIGNIERI. Plate V, fig. 7.

*B. Testá conicá, turbinatá, apice obtuso; anfractibus 5 planatis, et costulatis; costis (14) longitudinalibus, elatis, lineas transversas numerosas, elatas, distantes gerentibus.*

Shell conical, turbinated, apex obtuse, whorls 5, flattened and costated; costæ longitudinal, elevated, about 14 in a volution, and impressed by transverse lines: the lines are



numerous, distant, and elevated—a single one more elevated, being placed at the base of each whorl. The longitudinal ribs are occasionally unequal, one unusually large sometimes appearing, but not extending beyond the whorl, forming a varix after the manner of Triton; the columella is twisted, turned outwards at the base, and forms, with the outer lip, a short oblique channel, which is not perceptible upon the back of the shell; the outer lip is thin and dentated externally by the elevated transverse lines.

*Locality.* This species is moderately rare; it occurs in the coarse bed of planking at Minchinhampton Common, and is seldom well preserved.

BRACHYTREMA TURBINIFORMIS. Plate IX, fig. 35, 35a.

*B. Testá turbinatá, ventricosá, spirá elevatá; anfractibus 4 angustatis, convexis, nodulato-carinatis; ultimo anfractu ventricosó, costulis longitudinalibus; striis transversis numerosis, impressis; aperturá subrotundá, canali subnullo, columellá rectá.*

Shell turbinated, ventricose; spire elevated; whorls 4, narrow, convex, their sutures deeply impressed, having a nodulated carina; the last whorl is large and ventricose, having small longitudinal ribs crossed by numerous transverse striæ; the aperture is nearly round, the canal reduced to a mere notch; the columella straight.

This species is chiefly distinguished from its congeners by a greater dilatation of the last whorl, which is much expanded transversely. Unfortunately the beds of planking, which contain this and various other small univalves with ornamented surfaces, is of so coarse a structure, and adheres to the shells with such tenacity, that it is not often that their features can be distinguished. Length 6 lines.

*Locality.* Minchinhampton Common.

#### *Family*—BUCCINIDÆ.

PURPUROIDEA, *Lycett.* 1848.

MUREX, sp., *Sow.* 1827.

PURPURA, sp., *Buvignier.* 1843.

PURPURINA, sp., *D'Orb.* 1850.

*P. Testá turbinatá, spirá elevatá, aperturá non longiori, apice subacuto; anfractibus converis, in medio tuberculatis, anfractu ultimo ventricosó; basi truncatá, aperturá subquadrátá, superne acutá, inferne truncatá, latá; canali lato, recurvato; columellá arcuatá, rotundatá, lævi, basi acuminatá, incurvatá; labio effuso, in medio subdepresso, labro tenui et sinuato, umbilico oblecto.*

Shell turbinated; spire elevated, not longer than the aperture, with a somewhat acute apex; whorls convex, nodulated in their middle part, the last whorl ventricose, the base

truncated, the aperture subquadrate, acute above, widely notched at the base, but not deeply nor recurved; columella curved, and turning inwards at its base, which is pointed; it is rounded and smooth; the inner lip is effuse, rather depressed in the middle, covering an umbilicus; the outer lip is thin and somewhat sinuated.

This is one of the most remarkable of the Great Oolite genera of Univalves, and has not as yet been found in any other than the oolitic rocks. It constitutes an addition to the *Purpurifera* of Lamarck, or the *Entomostomata* of De Blainville. The following characters in their combination will be found sufficiently to distinguish it from all other known genera: the truncated base, the wide and shallow notch, the columella smooth, rounded, and curving inwards, the concealed umbilicus, and the thin sinuated outer lip. The young shells are delicately striated or grooved, the basal notch is scarcely formed, and they are perfectly free from adherent shells. On the other hand, the full-grown shells are always more rugose; with advance of age their sulcations or other markings become irregular, or are nearly obliterated, the basal notch becomes more important, and not unfrequently the whole external surface becomes covered with adherent shells. It would even seem that those encrusting shells were carried about by the animal during life. They are never found upon the young shells, or within the aperture, upon the left lip, about the basal notch, or, in fact, upon any part which was in contact with the soft parts of the animal. As the *Purpurioidea* are found lying in every possible position, the absence of adherent shells upon the parts in question may be held conclusive as to their period of attachment.

It will be seen, then, that the generic characters above enumerated acquire importance only upon their being viewed in combination. Owing, perhaps, to a want of attention to this circumstance, it may be that an undue value has been assigned to one or two characters, or to the inspection of ill-preserved specimens, or the want of a sufficient number to exhibit their several phases of form and markings;—to one or all of these causes of error we may ascribe the fact, that one of our species has already been thrice figured and described under two generic and three specific designations.

The beds of planking upon Minchinhampton Common are the productive site of this genus. The shells are clustered together over a small area. Originally the space was about 100 yards in length and half that extent in breadth; but from the rapid quarrying of the stone, which there occurs in very large blocks, by far the greater portion is now removed, and the genus has already become comparatively scarce. Two other localities, near and upon the same geological position, have furnished it, but very rarely, and in a bad state of preservation. In the upper division of the Great Oolite near Minchinhampton (from the white limestone upwards), the genus is likewise found occasionally over small areas, and in considerable numbers; but, owing to the compactness of the investing limestone, the shells can never be extricated except as casts. In this condition, with some small portion of the shell preserved, they resemble the specimen figured in the 'Mineral Conchology,' t. 578, fig. 4; but when entirely denuded of the crystalline shell, they have the aspect of *Natica*, and without great care might be taken for that genus, the surface is smooth,

and retains only the faintest traces of tubercles ; the axial umbilicus is very conspicuous ; and all trace of the wide basal notch being lost, the aperture resembles an entire-mouthed shell. The hard limestone being much used for rough walls, it is upon these, when partial disintegration has taken place, that the casts of *Purpuroidea* are to be found. The genus has never been discovered lower than the *planking*.

PURPUROIDEA MOREAUSIA. Plate IV, figs. 1, 1a, 2, 3, 3a, 4.

PURPURA MOREAUSIA, *Buvignier*. Mém. Soc. Philomath. Verdun, 1843, pl. 6, fig. 19, p. 26.

PURPURINA — *D'Orb.* Prod. Paléont., p. 357, 1850.

*P. Testá turritá, globosá ; spirá brevi, anfractibus 3—4, nodulosis vel spiniferis ; spinis magnis, obtusis, in serie unicá 7, 8, aut 9 in ambitu ; anfractu ultimo striato, striis regularibus transversè subundulatis (obsoletis in ætate seniori) ; aperturá amplá, subquadrátá ; canali dilatato, leviter excavato.*

Shell globose, spire prominent, whorls 3—4, angulated ; angles tuberculated ; tubercles large, elevated, 8 or in others 7, upon a volution ; the last whorl ventricose ; the tubercles increasing in size until they become large blunt spires ; beneath the tubercles the surface has numerous undulating closely-arranged encircling costæ ; the aperture is large and widely truncated at its base ; the inner lip is somewhat depressed in its middle part.

This is by much the most abundant, and at the same time typical species of the genus. There may be considered to be two varieties, one having 8, the other only 7, spines in a volution ; the latter variety has the spire more depressed, the aperture occupying three fourths of the entire length of the shell. The elevated longitudinal swellings, produced by the successive extensions of the outer lip in growth, sometimes interfere with the continuity of the encircling ribs,—cause them to undulate, and occasionally obscure them altogether ; hence, in the younger specimens, the ribs are more regular and distinctly marked. Very rarely, indeed, individuals have been found which simulate *P. nodulata*, the lines of growth being enlarged to imperfect ribs, which suddenly disappear, or are depressed at the place where, in the species referred to, the second circle of nodules is situated ; the spire also becomes more elevated, which adds to the resemblance. In the figure given by *Buvignier*, the inner lip is more flattened, or *Purpura* like, than might have been expected ; but the figure altogether is executed in a very indifferent manner.

*Locality.* The vicinity of Minchinhampton is the only locality in which this remarkable shell is known to have been procured in England. *Buvignier* mentions that M. Moreau, of St. Mihiel, has found it in the Coral rag of that place, and likewise in the ferruginous Oolite of Launoy.



PURPUROIDEA GLABRA. Plate IV, figs. 5, 5a, 6, 6a.

*P. Testá turbinatá, ovatá; spirá exsertá; anfractibus 5—6 angulatis, angulis tuberculos 10 gerentibus; anfractu ultimo ventricoso, lævi, basi truncatá; aperturá magná.*

Shell turbinated, ovate; spire elevated; whorls 5—6 angulated; angles tuberculated; tubercles 10 in a volution; the last whorl ventricose, smooth, the base truncated; the aperture large.

In the young state the spire is simply convex, without tubercles, which are only faintly visible upon the last whorl. In every stage of growth the tubercles are less conspicuous than in either of the other two species, and the surface of the last whorl is entirely destitute of ribs and of a second circle of tubercles; the spire is smaller than in *P. nodulata*, but more elevated than in *P. Moreausia*. The length of the aperture is three fifths of that of the entire shell.

*Locality.* It accompanies the other congeneric forms in the Minchinhampton Great Oolite, but is very much the most rare of them. The proportion of each species is probably as follows: *P. Moreausia*, 50; *P. nodulata*, 5; *P. glabra*, 1.

PURPUROIDEA NODULATA. Plate V, figs. 1, 1a, 2, 3, 4.

MUREX NODULATUS, *Young and Bird.* Geol. of Yorkshire Coast, p. 245, t. 11, fig. 3.

— TUBEROSUS, *Sow.* Min. Con., t. 578, fig. 4; but not t. 229, fig. 1, which is a Tertiary shell.

PURPURA LAPIERREA, *Buvignier.* Mém. Soc. Philomath. Verdun, 1843, p. 27, pl. 6, fig. 21.

PURPUROIDEA NODULATA, *Lycett.* Annals of Nat. Hist., 1848, p. 250.

MUREX TUBEROSUS, *Brown.* Illust. Foss. Conch., p. 59, pl. 34, fig. 19.

*P. Testá turbinatá, ovatá; spirá exsertá; anfractibus 5—6 angulatis; angulis tuberculos (9—11) plerumque elatiores gerentibus; anfractu ultimo subventricoso, tuberculis binis cincto, prope basin transversè carinato; tuberculis inferioribus minoribus, approximatis et in costulis longitudinalibus obliquis productis; aperturá magná subquadratá, labro dextro sinuato.*

Shell turbinated, ovate; spire elevated; whorls 5—6 angulated; the angles tuberculated; the tubercles usually elevated, 9, 10, or 11 in a volution; the last whorl ventricose, encircled with two rows of tubercles; those on the second row are much the smaller, and are more closely arranged, and prolonged into longitudinal oblique ribs, which are sometimes nearly obsolete; below the ribs is a transverse keel, placed near to the base of the shell. The aperture is of moderate size, the outer lip being much sinuated.

The first two or three whorls are convex, and destitute of tubercles; the tubercles vary much in size in different specimens—when very much elevated they are compressed laterally. In the young state, the apex of the spire is more acuminate, the surface

of the whorls has fine encircling striæ, the second circle of tubercles is not formed, or is merely rudimentary, and the longitudinal ribs beneath and basal carina are both absent; the last whorl has therefore a smooth aspect, which is in striking contrast with specimens of advanced age. The length of the aperture in the adult shell somewhat exceeds that of the spire; but the latter portion varies much in altitude, and occasionally exceeds the aperture in length. Upon the whole, the aspect of this species varies so considerably, independently of the changes produced by the stages of growth, that a considerable number are requisite for its full elucidation. It accompanies *P. Moreausia*, but is much more rare, probably in the proportion of about 1 to 10.

The figures given by Young, Sowerby, and Buvignier, present but a remote resemblance to each other and to our figures, but there cannot be much doubt of their identity. Young's figure represents an individual with a spire rather depressed; that in the 'Mineral Conchology' is from a mutilated specimen, little better than a cast. Buvignier's figure is likewise imperfect, besides which, the artist appears to have represented the inner lip of a true *Purpura*.

*Locality.* Minchinhampton Common.

This species has been found in Yorkshire only in the Coralline Oolite, where casts are stated to be not unfrequent in the hard limestone. M. Buvignier's specimen is from the ferruginous oolite of Vieil-St.-Remy.

#### *Family*—CERITHIADÆ.

CERITHIUM, *Adanson*, 1757. *Brug., Lam.*

Shell elongated, tuberculated or costated, seldom smooth; spire pyramidal or cylindrical, composed of numerous volutions; aperture subquadrate, terminated anteriorly by a short canal, which is most frequently reflected outwards and backwards.

CERITHIUM QUADRICINCTUM, *Goldf.* Plate IX, fig. 8.

CERITHIUM QUADRICINCTUM, *Goldfuss.* *Petref.*, p. 32, t. 173, fig. 11.

— — — *Bronn.* Index Palæont., p. 272.

*C. Testâ conicâ, anfractibus (10—12) quadrigonis, cingulatis, cingulis superficialibus quarternis granulatis; granulis longitudinalibus seriatis.*

Shell conical, spire obtuse, whorls (10—12) rather convex; encircled with four costæ; the costæ are granulated, so as to form a longitudinal series. The whorls are narrow, the height scarcely exceeding one third of the transverse diameter; the largest specimens do not exceed half an inch in length, and half of that length may be considered as the average dimensions.

*Locality.* It is by far the most abundant of the Great Oolite Cerithia, and may usually be seen sprinkled over the blocks of planking at Minchinhampton Common; but occurs indifferently in all the shelly beds.

CERITHIUM LIMÆFORME, *Röm.* Plate VII, fig. 2.

CERITHIUM LIMÆFORME, *Roemer.* 1836. *Nordd. Oolith.*, p. 142, t. 11, f. 19.

— — *Goldfuss.* *Petref.*, iii, p. 33, t. 173, f. 17.

— — *Bronn.* *Index Palæont.*, p. 269.

*C. Testá turritá, anfractibus (7—8) depressis, subplanis, cingillato-granulatis trilineatis, granulis majusculis approximatis costellas longitudinales formantibus, aperturá ovatá, canali brevi truncato.*

Shell turreted, apex pointed, whorls (7—8) depressed, nearly flat, having transversely nodulated costæ, three in number upon each whorl; the nodules are nearly joined longitudinally, presenting the appearance of longitudinal ribs in the young shell; but in a more adult state the upper row becomes more distinctly separated from the other two, which latter have sometimes an additional row of smaller granules between them.

This shell, as compared with *C. quadricinctum*, would appear to be much more rare; but as it requires a close inspection to distinguish them, some uncertainty must exist.

*Locality.* It accompanies the above-mentioned species in all the shelly beds. Its length does not exceed 3 lines.

CERITHIUM SEXCOSTATUM. Plate VII, fig. 3, 3a.

*C. Testá turritá, lævi, anfractibus convexiusculis, costatis; costis (6—7) longitudinalibus, lævigatis, rotundatis, angustatis, rectis; aperturá ovatá; caudá obsoletá.*

Shell turreted, smooth; whorls rather convex, costated; costæ (7—6) longitudinal smooth, rounded, narrow, and straight; aperture ovate. The ribs do not form a continuous line upon the volutions, a complete circle occupying more than 6, but less than 7 costæ, whose upper extremities scarcely reach the sutures of the whorls; the whorls are rather high, their junctions are deeply impressed, the last whorl being equal in length to two fifths of the entire shell. Axis  $7\frac{1}{2}$  lines.

*Locality.* The white stone of Bussage has furnished our only example.

CERITHIUM PENTAGONUM, *Archiac.* Plate IX, fig. 22.

CERITHIUM PENTAGONUM, *Archiac.* *Mém. Soc. Géol. Fr.*, tom. 5, p. 384, t. 31, f. 6.

— — *D'Orb.* *Prod. Paléont.*, p. 303.

— — *Bronn.* *Index Palæont.*, p. 271.



*C. Testá subulatá, apice acuto, anfractibus (10—11) planatis, pentagonalis, longitudinaliter costatis; costis 5 in ambitu, perpendiculariter continnis, elatis, subacutis; striis numerosis transversis impressis; canali minimá.*

Shell subulate, apex acute, whorls (10—11) flattened, pentagonal, longitudinally costated; costæ continuous, perpendicular, elevated, rather acute, 5 in a volution; striæ numerous, transverse; canal very small.

This elegant, symmetrical, and remarkable species has the junctions of the whorls strongly marked; it ranks among the choicest of our smaller shells. Axis 9 lines, transverse diameter 2 lines.

*Locality.* It has been found only in the planking of Minchinhampton Common and white stone of Bussage. We are not aware that more than four examples have been discovered.

CERITHIUM STRANGULATUM, *Archiac.* Plate IX, fig. 18.

CERITHIUM STRANGULATUM, *Archiac.* 1843. Mém. Géol. Soc. France, v, p. 382, t. 31,

figs. 1, a, b.

— — *D'Orb.* Prod. Paléont., p. 303.

— — *Bronn.* Index Palæont., p. 274.

*C. Testá minutá, subcylindricá, pupæformi, costatá; anfractibus subplanatis 7, transversim sulcatis; sulcis 4, penultimo 5; costis (6) rectis, elatis et longitudinaliter continuis ab apice ad anfractum penultimum; apertura constrictá, parvá, obliquá subrotundá; canali nullo.*

Shell minute, subcylindrical, or pupæform, costated; whorls nearly flat (7), transversely sulcated, sulci 4, and 5 upon the penultimate whorl; costæ 6, straight, elevated, and longitudinally continuous from the apex to the penultimate whorl; aperture contracted, small, oblique and somewhat rounded; no canal.

This little shell has prominent lines dividing the transverse sulcations; the costal elevations, although strongly marked upon the first three or four whorls, are not distinguishable upon the latter two; these whorls have also a greater proportional length than the others, their breadth but little exceeding their height; the junctions of the whorls are not very strongly marked, the apex of the spire is obtuse, the aperture much contracted, rounded, and oblique or pupæform.

The obtuse spire, flattened whorls, and fewness of the costæ, will distinguish this from *C. bulimoides*, Deslongchamps, and *C. Römeri*, Goldfuss; to which in other respects it has some resemblance. We have considered it a variety of *C. strangulatum*, *Archiac*, although in that species the apex is pointed, the general breadth is greater, and the costæ are continued even to the base of the shell.

*Locality.* Ancliff, Wiltshire; Eparey, France.

## CERITHIUM TENNANTI. Plate IX, fig. 20.

*C. Testá turritá, acutá, conicá, anfractibus numerosis, angustatis, tricinctis; carinis tribus, elatioribus, striis numerosis longitudinalibus impressis; basi planatá, canali brevissimá.*

Shell turreted, acute, conical, whorls numerous, thrice cinctured; the bands elevated, and impressed with numerous longitudinal striæ; base flattened, canal obsolete.

The transverse keels are equal, narrow, and elevated, one being mesial, the others close to the anterior margin of the whorls; the figure is perfectly regular, and the whorls narrow; the aperture and canal are very short.

*Locality.* Ancliff.

Named after Prof. J. Tennant, from whose interesting collection of Oolite Fossils this species is figured.

CERITHIUM ROISSII, *Arch.* sp. Plate VII, fig. 14, 14a.

TURRITELLA ROISSII, *Archiac.* 1843. Mém. Soc. Géol. Fr., vol. v, p. 380, t. 30, f. 2.

— — *Bronn.* Index Palæont., p. 1336.

CHEMNITZIA ROISSII, *D'Orb.* Prod. Paléont., p. 298.

*C. Testá turritá subconicá, laevi, apice acuto; anfractibus paucis, planatis; suturis vix tumidulis; caudá brevi subrectá.*

Shell turreted, subconical, smooth; apex acute; whorls few, flattened; the sutures slightly tumid; canal short, and nearly straight.

A very short or conical species, the diameter of which through the last whorl is upwards of half the entire length of the shell; a longitudinal section displays a columella of great thickness, the internal cavity being small.

*Locality.* Rare in the Great Oolite of Minchinhampton Common. Eparey, France.

NERINÆA, *DeFrance.* 1825.

Shell turreted, either conical or cylindrical, consisting of numerous whorls; aperture subquadrate, having an anterior and posterior short canal; columella, with one or more folds; outer lip, with one or more folds, which are continued through the length of the shell; columella umbilicated in the conical, solid in the cylindrical species.

NERINÆA VOLTZII, *Desl.* Plate VII, figs. 11, 11a; var? figs. 7, 7a.

NERINÆA VOLTZII, *Deslongchamps.* 1842. Mém. Soc. Linn. Normandie, vol. vii, pl. 8, fig. 34.

— — *D'Orb.* Prod. Paléont., p. 298. (Not *N. Voltzii*, *D'Arch.*)

*N. Testá turrito-conicá, spirá angulo 18°—22°, anfractibus subplanis inornatis; columellá crassá, prius solidá denique perforatá, plicas duas parvas, remotas gerente; labro dextro intus uniplicato, aperturá rhomboidali.*

Shell elongated, conical, smooth; in its young state there is usually a slight depression round the lower part of each whorl, this is gradually lost in the larger whorls, which are quite flat; but specimens may be found in which all the whorls are slightly convex. The columella is solid in the young shell; but usually becomes perforated about an inch below the apex; there is great variety in this respect in different specimens, the perforation sometimes commencing within half an inch from the apex, while other shells, an inch and a half long, may be found quite solid. The spiral angle also varies from 20° to 22° in different specimens; in some instances the sides of the shell are straight, in others the lower part is more cylindrical than the upper; in some few instances the lower part of the shell enlarges more rapidly than the upper, in which case the perforation of the columella is unusually large. Thus the species varies in its external form, from a neat, regular shell, to a very clumsy one. The aperture is rhomboidal, its height being half as much again as its width, ending below in a short canal. There are three internal folds, viz.: one on the outer lip, near to the base of the whorl, which is insignificant at the aperture, but long and strong in the inner whorls; another, thick and blunt on the columella, a little below the preceding; thirdly, one small and blunt on the top of the whorl. These folds are very constant in form, and serve to distinguish the species readily.

Sutural angle . . . . . 90° to 95°

Basal angle . . . . . 125° to 130°

Length, 1 inch to 2½ inches.

In the young state, or when the axis does not exceed 10 or 12 lines, the aspect is so dissimilar of this protean shell, that a particular description of that condition is necessary:—It is taper and pointed, the volutions are convex, very narrow, an individual of 9 lines having as many whorls. The sutures are very deeply depressed, the shell is altogether delicate and fragile, but perfectly regular. Specimens exceeding 10 lines increase disproportionally in the height of their whorls; they become more flattened, the sutures are less strongly defined, the shell acquires a considerable increase of thickness, and the whole is changed.

*Locality.* This specimen occurs in every stage of growth and throughout the entire thickness of the formation in Gloucestershire; its habits were gregarious—the shelly weatherstones more especially contain it in great numbers.

NERINÆA (TROCHALIA) EUDESII. Plate VII, fig. 6, 6a.

? CERITHIUM DEFRANCI, *Deslongchamps*. Mém. Soc. Linn. Normandie, vol. vii, pl. 8, fig. 36.

*N. Testá turritá, conicá, anfractibus (10) concavis, angustatis, lineis transversis cinctis*



*cum aliis minoribus alternatis, suturis carinatis, carinis elatis et lævigatis, basi planulatá, canali brevissimo; aperturá subquadratá.*

Shell turreted, conical, excavated; whorls (10) concave, narrow, with numerous transverse very fine lines, alternating with others still more faintly impressed; the sutures are carinated, the carinæ elevated and smooth, the base flattened, the canal short. Aperture subquadrate.

The general aspect of our species approaches near to the *Cerithium Defrancii* of M. Deslongchamps, whose figure however is less conical, and the concavity of the whorls is much less. These differences, however, are only such as may pertain to varieties of the same species. It is rare; and the few examples which have occurred to us are composed entirely of crystalline carbonate of lime, which does not allow of the internal characters being fully determined; as far as we can observe them, the outer lip is simple, and the columella plicated with one fold, and the upper portion of the volution has a very slight fold. This shell belongs to the subgenus *Trochalia*, Sharpe; but to the species having the columella solid and not hollow.

*Locality.* The upper portion of the shelly beds near to Minchinhampton and Chalford.

NERINÆA DUFRENOYI, *Arch.* sp. Plate VII, fig. 8, 8a—8e.

CERITHIUM DUFRENOYI, *Archiac.* 1843. Mém. Soc. Géol. Fr., vol. v, pl. 31, figs. 3, 4.

— — — D'Orb. 1850. Prod. Paléont., p. 303.

*N. Testá parvá, cylindrico-subulatá; anfractibus latis, planatis, costulis cinctis, et nodulatis; cingulis 4 aut 5, inæqualibus dense-nodulatis, cingula infra suturam valde elatá, et lævigatá, sine nodulis. Anfractibus lineis perpendicularibus, interstitialibus dense et tenuissime instructis. Aperturá elongatá, columellá solidá, plicis duabus? parvis; plicá externá unicá, magná.*

Shell small, cylindrical, or subulate; the whorls wide, flattened, encircled with costæ, which are nodulated; the encircling bands are 4 or 5, unequal and closely, but sometimes imperfectly, nodulated; the band nearest to the upper suture the largest and most elevated, it is nearly smooth, and without nodules. The surface of the volutions has also very closely-arranged fine perpendicular lines visible upon the interstices of the cinctures. The aperture is elongated and narrow; the columella solid, with two small folds; the outer lip has a single, much larger fold.

The perpendicular length of the whorls is nearly equal to their transverse diameter; the sutures are strongly marked. The usual length of this species does not exceed an inch, the number of volutions in large specimens not exceeding ten. The coarseness of the Great Oolite rock is not favorable to the preservation of the more delicate features of this pretty and fragile species, so that in the greater number of instances the surface of the

whorls is nearly smooth. It occurs in all the shelly beds of the formation in Minchinhampton district, and may be discovered in every quarry, sometimes in great numbers.

The smallness of the object, and the state of preservation, renders it difficult to obtain a good section of the interior; the folds upon the columella have been but imperfectly disclosed, but there is little doubt that they are as above described; the aperture is usually more narrow than is represented at fig. 8a.

*Locality.* Minchinhampton Common; Eparcy, France.

NERINÆA STRICKLANDI. Plate VII, fig. 9, 9a.

*N. Testá cylindrico-subulatá, anfractibus latis, planatis, superne leviter convexis, suturis profundis impressis; cingulis scabris aut crenulatis, numerosis et approximatis, superne evanescentibus: aperturá, plicisque ignotis.*

Shell cylindrical or subulate; whorls wide, numerous, flattened, or very slightly convex on their upper portions, their sutures strongly marked; the whorls are encircled with numerous, closely-arranged, scabrous, or crenulated lines, which are nearly obsolete upon their upper portions: aperture and plicæ unknown.

The character of the surface much resembles *Cerithium tortile*, Deslongchamps; but the whorls in that shell are much more convex and narrow; in the present species the length of the whorls perpendicularly is about equal to their transverse diameter.

*Locality.* The Stonesfield slate on the borders of Minchinhampton Common has furnished our specimens; they have occurred rarely, and only in fragments; when perfect, the length must be considerable.

NERINÆA PUNCTATA, Voltz. Plate VII, fig. 10, 10a, b, c.

NERINÆA PUNCTATA, Voltz. and Bronn. Jahrb., 1836, p. 559, t. 6, fig. 23.

— — — Bronn. Index Palæont., p. 803.

*N. Testá turrito-conicá, anfractibus sub-gradatis, cingulatis, cingulis binis ternisque nodulosis; columellá solidá, biplicatá, labro dextro uniplicato.*

Shell elongated, conical, with a regular spiral angle of about  $18^\circ$ ; whorls flat, projecting at the upper part beyond the whorl above, and thus giving a step-like outline to the shell; ornamented with two or three transverse finely-knotted rings: columella solid. Three internal folds, viz.: one strong sharp fold on the middle of the outer lip; one smaller fold on the columella, a little lower than the former, and a blunt thick fold on the top of the whorl near to the columella. Aperture rhomboidal, rather higher than wide.

This is a more regular and elegant shell than *N. Voltzii*, to which it is so nearly allied, that worn specimens of the two species may easily be confounded: in that case the *N. punctata* may be distinguished by its step-like outline, flatter base, and longer and

sharper folds on the columella. With *N. elegans* (Thurm.) it may perhaps be identical, in which case that name must be adopted for it: until this is decided we must call our shell *N. punctata*, as it is clearly the species so designated by Voltz.

Sutural angle, about  $92^{\circ}$

Basal angle, about  $120^{\circ}$

Length, from 1 to 2 inches.

*Locality.* Found in the shelly beds near Minchinhampton, and more frequently in the quarries to the north of the vale of Chalford.

NERINÆA FUNICULUS, *Desl.* Plate VII, fig. 12, 12a, b.

NERINÆA FUNICULUS, *Deslongchamps*. 1842. *Mém. Soc. Linn. Normandie*, vol. vii, p. 186, t. 8, figs. 30—32.

— CYLINDRICA, *Deslongchamps*. L. c., t. 8, fig. 33.

CERITHIUM BLAINVILLII (?), *Deslongchamps*. L. c., t. 8, fig. 35.

NERINÆA FUNICULOSA, *D'Orb.* *Prod. Paléont.*, p. 298.

*N. Testá turritá, longissimá; anfractibus superioribus concavis, transversè striatis, inferioribus subplanis, aliis ad suturas tumescentibus, aliis vix prominulis; columellá solidá, triplicatá, labro dextro uniplicato.* (*Deslongchamps*, l. c.)

Shell very long and taper, but differing in the spiral angle in different specimens from  $8^{\circ}$  to  $12^{\circ}$ ; the upper whorls are concave, with a strong projection at the suture, variously ornamented with from 5 to 10 transverse ribs of unequal fineness, one or two of which (in very well-preserved specimens) are seen to be composed of small knobs; the lower whorls become gradually flatter and smoother, and finally lose all traces of ribbing: columella solid. Four internal folds, viz.: one strong, thick fold on the outer lip, rather below the middle of the whorl; two on the columella, of which the lower sharp and well-defined is situated below that on the outer lip, and the upper faint and sometimes hardly visible, is placed opposite to the upper edge of the outer fold; and one sharp and long fold on the top of the whorl, close to the columella.

*Nerinea cylindrica* of *Deslongchamps* appears to be a tapering variety of the same shell, in which the upper fold on the columella is ill-developed, or perhaps imperfectly seen.

This species is also closely allied to *N. fibula*, *N. Goodhalli* (not Sowerby's species), and *N. clarus* of *Deslongchamps*, all of which are probably one species: it differs from them in the greater concavity of the whorls, the transverse ribbing, and the presence of the upper small fold on the columella. It has probably been confounded with *N. fasciata* of Römer—a species which sadly wants revision.

Sutural angle, about  $105^{\circ}$ .

Basal angle, about  $120^{\circ}$ .

Length, up to 5 inches, but rarely exceeding 3 inches.

*Locality.* It is tolerably abundant in the shelly beds near Minchinhampton; but owing to its great fragility, large specimens can rarely be procured entire.



CERITELLA. *Nov. Gen.*

*C. Testá turrítá, spirá acutá, subulatá, anfractibus planis, marginibus sapissimè sulcatis; anfractu ultimo amplo; aperturá elongatá, obliquá (canali (?)) brevissimá) columellá lævigatá, rotundatá ad basim subreflexá.*

Shell turreted, spire acute, subulate, volutions flattened, their margins usually sulcated; the last whorl large, aperture lengthened and oblique, canal very short; columella smooth, rounded, and slightly reflected at the base; outer lip thin.

This genus is constituted to receive several species of subulate univalves, usually smooth, but sometimes sculptured longitudinally, which seem to be equally removed from *Terebra* on the one hand, and *Cerithium* on the other; from the genus *Fusus* they are still more remote. The increased size of the last whorl, together with the elongated narrow aperture, detach it from the *Cerithiæ*; neither has it the decided twist of the columella, which we find in *Terebra*; the base never terminates in a notch, but in a narrow, very short, channel, which is turned slightly forwards and outwards; the whorls are generally flattened, the length of the spire exceeding that of the aperture.

The *Ceritellæ*, from their individual number and variety of species, constitute an important group in the Great Oolite univalves. The delicacy of the outer lip is such, that a specimen with that part perfect has scarcely ever been obtained, the remaining portion usually giving to the base the aspect of a short channel, slightly directed outwards. It is certain, however, that in several of these species the base of the aperture is very narrow, and slightly twisted, approaching nearly to the channelled form, a character which, together with that furnished by the spire, separates it sufficiently from the *Acteoninae* properly so called, and to which some of the species have a slight resemblance. We have, therefore, provisionally arranged these shells in this part of the series, until the characters of the aperture are more fully developed.

CERITELLA ACUTA. Plate V, figs. 17, 17a, 18, 18a.

*C. Testá turrítá, lævigatá; spirá elatá, acutá; anfractibus (6) convexiusculis; aperturá obliquá angustatá, caudá recurvâ brevi.*

Shell turreted, smooth; spire elevated, acute; whorls (6) rather convex, aperture oblique, narrow; canal recurved and short.

The figure of this species varies considerably. The young shells are usually the most subulate. The length of the last volution is generally half that of the entire shell. Axis 10 lines, transverse diameter 4 lines.

*Locality.* It is numerous in all the shelly beds in the vicinity of Minchinhampton.

CERITELLA UNILINEATA, *Sow.*, sp. Plate V, fig. 13.BUCCINUM UNILINEATUM, *Sow.* 1825. Min. Con., t. 486, figs. 5, 6.— — — *Morris.* 1843. Cat. Brit. Foss., p. 139.PURPURINA UNILINEATA, *D'Orb.* 1850. Prod. Paléont., p. 302.

*C. Testá parvá, ovato-elongatá, gibbosá; spirá acutá; anfractibus (7—8) angustatis, superne planis et subangulatis.*

Shell small, ovately elongated, gibbose; ; spire acute; whorls (7—8) narrow, flattened in their upper portions or subangulated.

This little gibbose shell has a spire about equal in length to the last whorl; the whorls are bevelled near to their upper junctions, or slightly depressed, which gives the appearance of a line or furrow encircling them. Axis  $4\frac{1}{2}$  lines, transverse diameter 2 lines; but the Ancliff specimens are usually smaller.

*Locality.* The white stone of Bussage has furnished only one specimen near Minchinhampton; but it is much more abundant at Ancliff.

## CERTELLA PLANATA. Plate V, figs. 14, 14a.

*C. Testá turritá, acutá; anfractibus angustatis, numerosis, planis ad basim unilineatis, aperturá et caudá ut in C. acutá.*

Shell turreted, acute; whorls narrow, numerous, flattened; a single encircling line is placed at the lower part of each whorl, a little above the suture; aperture and canal as in *C. acuta*. Axis  $4\frac{1}{2}$  lines, transverse diameter  $2\frac{1}{2}$  lines.

*Locality.* Rare: the specimen figured is from the white stone of Eastcombs, in the parish of Bisley.

## CERITELLA SOWERBII. Plate V, fig. 16.

*C. Testá turritá, subfusiformi, acutá; anfractibus (7—8) convexiusculis, infra suturam unilineatis; aperturá obliquá, elongatá; caudá brevi.*

Shell turreted, subfusiform, acute; whorls (7—8) slightly convex, with a transverse line beneath the suture; aperture oblique, lengthened; canal short.

This species varies considerably in the elevation of the spire. Axis 8 lines, transverse diameter 3 lines.

*Locality.* It occurs in the upper portion of the shelly beds, both north and south of the vale of Brimscomb. It is rare.

CERITELLA MITRALIS. Plate V, fig. 15.

*C. Testá conicá, apicè acuminatá, anfractibus (7) angustatis, planis, marginibus sub-tumescenscentibus; aperturá parvâ, obliquâ; canali brevi.*

Shell conical, apex acute, whorls (7) narrow, flattened, their upper margins slightly turned; aperture small, oblique; canal short.

This species is unusually short and conical. Axis 5 lines, transverse diameter 3 lines.

*Locality.* The planking of Minchinhampton Common, where it is rare.

CERITELLA CONICA. Plate V, figs. 10, 10a, 10b, 10c.

*C. Testá turritá, acutá; anfractibus angustatis planis (8); costis longitudinalibus, a dextro ad sinistram obliquis; aperturá angustatá, canali obliquo.*

Shell turreted, acute; whorls narrow, flattened (8), with longitudinal oblique ribs, passing obliquely from right to left; aperture narrow, canal oblique.

The upper margin of each whorl has a slight encircling rib, which is united to the oblique costæ. The character of the markings in this species resembles *C. gibbosa*; but in that species, although the whorls are equally numerous, the spire is very small, and the canal is almost obsolete. The length of the last whorl is two fifths of the entire shell. Axis  $6\frac{1}{2}$  lines, transverse diameter 3 lines.

*Locality.* The planking of Minchinhampton Common and white stone of Bussage have furnished it but rarely.

CERITELLA GIBBOSA. Plate IX, fig. 17.

*C. Testá parvâ turritá, spirâ mediocriter elatâ, apice acuto, anfractibus planatis, angustatis et angulatis, longitudinaliter costatis; costis numerosis, a dextro ad sinistram obliquis; anfractu ultimo, magno; aperturâ obliquâ, angustatâ et elongatâ.*

Shell small, turreted; spire moderately elevated; apex acute; whorls flattened at the sides, narrow, and angulated at their upper portions; longitudinally costated; costæ numerous, directed obliquely from right to left; the last whorl large; aperture oblique, narrow, and elongated.

The angle of the whorls is slightly thickened and prominent; the costæ are distinct immediately beneath it, but are not discernible upon the lower portion of the whorls. The length of the aperture is equal to the remaining portion of the shell. The specimen figured is rather more gibbose than usually obtains, for the proportions vary, but in point of size there is no considerable difference. It is somewhat rare, and occurs in the soft shelly Oolite which underlies the planking. Axis 3 lines.

*Locality.* Minchinhampton Common.



CERITELLA LONGISCATA, *Buv.* sp. Plate IX, fig. 14.

PLEUROTOMA LONGISCATA, *Buvignier*. Mém. Soc. Philom., Verdun, 1843, pl. 6, fig. 8.

*Testá parvá, turritá, elongatá; apice acuto; anfractibus (9—10) subplanatis; costis longitudinalibus rectis numerosis, carinatis; carinâ unicâ marginali; aperturâ angustatâ; caudâ subrectâ.*

Shell smooth, turreted, elongated; apex acute; whorls (9—10) rather flattened, with longitudinal, straight, numerous ribs; and a single encircling smooth carina upon the upper margin of the whorls; aperture narrow, canal straight, short. Axis 3 lines.

*Locality.* This little species accompanies its allied forms in the soft shelly Oolite beneath the planking of Minchinhampton Common. It is very rare.

CERITELLA RISSOIDES, *Buv.* sp. Plate IX, fig. 7.

? PLEUROTOMA RISSOIDES, *Buvignier*. Mém. Soc. Philom., Verdun, 1843, pl. 6, fig. 9.

*Testá parvá, turritá; spirâ mediocri elatâ; apice acuto; anfractibus angustatis, posticis carinatis, carinâ rotundatâ; costis longitudinalibus, rectis, subincurvis; anfractu ultimo elongato; aperturâ angustatâ.*

Shell turreted, spire moderately elevated, apex acute, whorls narrow, carinated at their posterior margin; carina rounded; costæ longitudinal, straight, or slightly curved; last whorl elongated; aperture narrow. Axis 2 lines.

*Locality.* This pretty minute species is usually found in the soft shelly Oolite beneath the planking of Minchinhampton Common. It is somewhat rare.

## Family—NATICIDÆ.

NATICA, *Adanson*. 1757. *Lam.*

The species of *Natica* in the Great Oolite are divisible into two groups; one the *Natica* proper, the others we have arranged in the sub-group *Euspira*, a name suggested by Agassiz, for those species which have the spire more or less elevated, and the volutions distinct.

The *Naticæ*, though consisting of a considerable number of species, have, with one exception, furnished but a small number of individuals; and those belonging to the sub-group *Euspira* are all rare in the Great Oolite.

NATICA.

Shell subglobose, thick, smooth; spire pointed, more or less elevated, of few volutions, aperture large, oblique, ovate, entire; columella lip oblique, thickened, the umbilicus being nearly covered by a deposition of shelly matter upon the columella; outer lip simple, smooth.

NATICA INTERMEDIA. Plate VI, figs. 1, 1a.

*N. Testá ovatá, spirá elatá, anfractibus (5) convexis, angustis, superne planis; averturá ovato-elongatá, basi latá.*

Shell ovate, spire elevated, whorls (5) convex, narrow, flattened above; aperture ovately elongated, base wide.

The general contour of this shell approaches nearer to *Natica adducta*, Phillips, than any other Great Oolite species which we have examined. Its position is intermediate to that species and our *Natica Stricklandi*, which latter species is more elongated. In all these shells the upper portion of the whorls is horizontal; but in *N. adducta* it is even depressed as it approaches the suture, forming a narrow channel. *N. intermedia* is more ovate, or less globose, than *N. adducta*. In that species the transversal is equal to the longitudinal diameter; but in *N. intermedia* the dimensions are as follow: Length 2 inches, breadth 1 inch 7 lines.

*Locality.* The planking of Minchinhampton Common has supplied the few specimens we have met with.

NATICA GRANDIS, Goldf. Plate VI, fig. 12.

NATICA GRANDIS, Goldfuss. Petref., iii, p. 118, t. 199, fig. 8.

— — Bronn. 1848. Index Palæont., p. 783.

*N. Testá globoso-depressá, spirá subexsertá, anfractibus convexiusculis, ultimo anfractu ventricosó; margine depresso; averturá semilunari; umbilico tecto.*

Shell globose, depressed; spire little elevated; whorls rather convex, their margins rather depressed, the last volution ventricose; the aperture large, semilunar; the umbilicus covered by a callosity of the lip.

We have only met with three examples of this species: two of these were obtained from the upper limestone beds, the other from the planking. The general form is more ventricose, and the last whorl more expanded, than either of our other species. The nearest approximation to it is the *Natica adducta*, Phillips, of which, possibly, our shell may only exhibit a more advanced stage of growth; but as the spire of that species is more produced, and as our shell perfectly agrees with the species figured by Goldfuss, we prefer, for the present, to retain his designation.

*Locality.* Minchinhampton.

**NATICA STRICKLANDI.** Plate XI, figs. 24, 24a.

*N. Testá ovatá, spirá elatá, anfractibus convexiusculis, superne rotundatis, suturis subdepressis; aperturá oblique ovatá; basi angustatá.*

Shell ovate, spire elevated, whorls rather convex, rounded above, their sutures slightly depressed; aperture oblique and ovate; base attenuated.

The length of the aperture scarcely exceeds half of the entire shell; the whorls, which are not numerous, are moderately wide, and somewhat flattened at their base; the apex is rather obtuse, and the general form is more cylindrical than is usual with shells of this genus, the largest transverse diameter being only equal to the length of the last and penultimate whorl. We have only obtained two specimens which occurred in the soft shelly Oolite underlying the planking, but, judging from casts, we should be inclined to believe the upper portion of the formation likewise contains it. It has been named as a trifling tribute of respect to H. E. Strickland, Esq., one of the few English geologists who, of late years, have contributed to our knowledge of the Oolitic system.

*Locality.* Minchinhampton.

**NATICA FORMOSA.** Plate VI, fig. 10.

*N. Testá orato-elongatá, spirá elatá, anfractibus (5) convexis, ultimo anfractu oblique ventricoso; aperturá magná ovatá; basi rotundatá, labro sinistro excavato.*

Shell ovately-elongated, spire elevated, whorls (5) convex, the last whorl ventricose and oblique; the aperture large, ovate, the inner lip excavated, the base rounded.

We were at first disposed to refer this species to *Natica elegans*, Sowerby, but an examination of additional specimens has convinced us of its specific distinctness. As compared with that species, the spire is always much larger, and less angulated, and the aperture bears a much less proportion to the entire length, its longer diameter scarcely amounting to three fifths of the entire length of the shell. It occurs both in the planking and upper portion of the formation, but is somewhat rare. Length 26 lines, breadth 20 lines. The apex, when perfect, is more acute than our figure represents.

*Locality.* Minchinhampton.

**NATICA TANCREDI.** Plate VI, fig. 11.

*N. Testá ovatá, spirá elatá, anfractibus (5) angustatis in medio subangulatis; apice obtuso; anfractu ultimo subcylindrico, permagno; aperturá obliquá angustatá; basi subacuminatá.*

Shell ovate, spire elevated, whorls (5) narrow, somewhat angulated in their middle portions; the apex is obtuse, the last whorl is very large, and subcylindrical; the aperture oblique and narrow, the base somewhat pointed.



The narrowness of the base, narrow subangular whorls, obtuse apex, and subcylindrical figure of the last whorl, are the prominent features.

It has been named in compliment to Sir Thomas Tancred, Bart., the founder of the Cotswold Naturalists' Club.

*Locality.* The fine specimen figured was obtained in the hard white limestone of the upper portion of the Great Oolite formation near Minchinhampton, but it likewise occurs in the planking, being rare in both situations.

NATICA GLOBOSA, *Roem.* Plate VI, fig. 14.

NATICA GLOBOSA, *Roemer.* 1836. Nordd. Oolith., p. 156, pl. 10, f. 9.

— — *Bronn.* 1848. Index Palæont., p. 783.

*N. Testá globosá, obliqua, ovato-orbiculari, hemisphericá; spirá latá, prominulá; aperturá subreniformi; umbilico amplo.*

Shell globose, oblique, ovately orbicular, hemispherical; spire large, but not much elevated; aperture kidney-shaped; umbilicus large.

All our specimens have been obtained from the upper or limestone portion of the Great Oolite; we have, consequently, been able to obtain only portions of the shell. The figure approaches so near to some of the casts of *Purpuroidea Moreausia*, that it is difficult, in the absence of nodules, to distinguish them. Our species is, however, more depressed, and the preserved portions of the shell are thicker than in the *Purpuroidea*; but we should always expect to find some traces of nodules in well-preserved casts of the latter genus. Length 14 lines, breadth 16 lines.

*Locality.* Minchinhampton.

NATICA NERITOIDEA. Plate VI, fig. 4.

*N. Testá oblique-ovatá; spirá parvá, obtusá, depressá; anfractu ultimo elongato; aperturá angustatá, obliquá; labio interno calloso.*

Shell smooth, oblique, ovate; spire small, depressed, and obtuse, the last whorl elongated and narrow at the base; the aperture narrow and oblique, the inner lip thickened.

Two examples, with the shell partially preserved, are our authority. They are remarkable for the rounded and depressed form of the spire, which gives it a truncated aspect: it is likewise turned to one side simulating a *Nerita*. The form of the aperture and base is more narrow or contracted than any other Great Oolite species. Length 13 lines, width 9 lines.

*Locality.* A bed of sandy limestone, about 100 feet above the Fullers-earth.

NATICA VERNEUILI, *Archiac*. Plate VI, figs. 6, 6a, 7, 7a.

NATICA VERNEUILI, *Archiac*. 1843. Mém. Soc. Géol. France, t. 5, p. 378, pl. 30, fig. 3.

— — *Bronn*. 1848. Index Palæont., p. 788.

— — *D'Orb*. 1850. Prod. Paléont., p. 299.

*N. Testá subhemisphericá, spirá elatá, anfractibus (5) angustis et convexiusculis, apicè acuto; anfractu ultimo per magno, ventricosó; aperturá magná semilunari; basi latá et rotundatá.*

Shell subhemispherical, spire elevated, whorls (5) narrow and slightly convex, apex of the spire acute, last whorl very large and ventricose, aperture large, semilunar, base wide and rounded.

The planking has supplied the only good specimens of this rare species. It would also seem to occur in the calcareo-arenaceous beds of the upper portion of the formation, judging by the aspect of casts. Length 23 lines, breadth 22 lines.

*Locality.* Minchinhampton. Eparcy, France.

NATICA MICHELINI, *Archiac*. Plate VI, figs. 2, 2a, 3, 3a.

NATICA MICHELINI, *Archiac*. 1843: Mém. Géol. Soc. France, t. 5, p. 377, pl. 30, fig. 1.

— — *Bronn*. 1848. Index Palæont., p. 785.

— — *D'Orb*. 1850. Prod. Paléont., p. 299.

*N. Testá ovatá, spirá parva, apicè submamillato; anfractu ultimo elongato, basi lata; aperturá supernè angustatá; labro interno calloso convexiusculo.*

Shell ovate, spire small; apex submamillated, last whorl elongated, its base wide; aperture narrow above; lip somewhat thickened, straight, and convex.

The straight border of the inner lip, its convexity, and the minute spire, sufficiently characterise it. The spire consists of 5 or 6 whorls, of which the first two or three form a minute mamillated apex. Our figures sufficiently represent the varieties of form, of which the more elongated is the most common. The planking contains it not unfrequently; and some beds in the upper limestones contain numerous casts, which can scarcely be referred to any other shell.

Length of the globose variety 15 lines, width 16 lines; length of the elongated variety 18 lines, width 13 lines.

*Locality.* Minchinhampton. Eparcy and Sancerre, France.

NATICA AMBIGUA. Plate VI, fig. 5.

? CASSIS EPARCYENSIS, *Archiac*. 1843. Mém. Soc. Géol. France, tom. v, p. 385, pl. 31, fig. 10.

? ACTEONINA EPARCYENSIS, *D'Orb*. 1850. Prod. Paléont., p. 299.

*N. Testá hemisphæricá, spirá parvá, depressá; apice acuto; anfractibus angustatis, planis, anfractu ultimo ventricosó; aperturá ellipticá.*

Shell hemispherical, spire small, depressed; the apex acute; whorls narrow and flattened, the last whorl ventricose; aperture of moderate size, and elliptical; inner lip rounded.

The general figure approaches to globular, except at the base of the spire, which is flattened, and only the small volutions rise above the wide and flattened upper surface of the last whorl; the base is comparatively narrow; the inner lip is gracefully curved, but not apparently thickened, nor is there any trace of an umbilical fissure. One specimen only was obtained in the planking. It is imperfect about the outer lip, and scarcely half the dimensions of the shell figured by D'Archiac. Length 10 lines, breadth 10 lines.

*Locality.* Minchinhampton; Eparcy, France.

#### *Sub-Genus—EUSPIRA, Ag.*

Shell smooth, ovate; spire elevated; of few whorls, which are angulated, the angles sometimes taking the form of a carina; less frequently the last whorl has a second carina, or the carina becomes nodulous or tuberculated; aperture entire, elliptical, modified by the angle of the whorl; base wide, rounded; pillar lip smooth and excavated, outer lip thin and smooth.

The Great Oolite shells referable to this genus are all rare. One of them, however (*E. canaliculata*), though rare in this formation, is abundant in the middle division of the Inferior Oolite.

*EUSPIRA CANALICULATA.\** Plate XI, fig. 23, 23a.

*E. Testá oblongá, spirá sub-cæsertá, apice acuto, anfractibus angulosis, angulis acutis; anfractibus superne profunde canaliculatis, inferne sub-convexis; anfractu ultimo obliquo, basi attenuatá; aperturá ellipticá, fissurá umbilici angustatá.*

Shell oblong, spire but little elevated, apex acute, whorls angulated, the angles acute, the upper portion of the whorls deeply channelled, their lower portions rather convex, the last whorl oblique, its base attenuated; aperture elliptical, the umbilical fissure narrow. Several obscure encircling lines may be traced upon the middle of the last whorl. The specific characters of this shell are so strongly marked that it will not readily be mistaken for any other; several specimens have been extracted from the limestone beds in the upper portion of the Great Oolite; but in the middle beds of the Inferior Oolite in Gloucester-

<sup>1</sup> Although we have provisionally arranged this and the four following species under a sub-genus of *Natica*, they present considerable affinities to the Palæozoic genus, *Scalites* (Hall), in the lines of growth having the appearance of a slight fissure where the angle occurs in the volution.



shire it is much more common. Length 14 lines, breadth 12 lines, length of aperture 10 lines, breadth 6 lines.

*Locality.* Minchinhampton.

**EUSPIRA SHARPEI.** Plate XI, fig. 22.

*E. Testá oblongá; spirá elatá, apice acuto, anfractibus angulosis; angulis acutis et prominentibus, superne tabulatis, inferne planis; aperturá magná, labro sinistro excavato et umbilicato.*

Shell oblong, spire elevated, its apex acute, volutions angulated, the angles acute and prominent, the upper surfaces of the whorls nearly flat, but rising a little towards the suture, the lower portion flattened; aperture large, inner lip excavated with an open umbilicus.

This species most nearly resembles *E. canaliculata*, but in the present shell the spire is very much more elevated; the upper surfaces of the whorls are not channelled, and their lower portions are not convex.

*Locality.* Minchinhampton. It is very rare, and has been found only in the planking. Length 18 lines, breadth 15 lines.

Named in compliment to D. Sharpe, Esq., F.R.S.

**EUSPIRA PYRAMIDATA.** Plate VI, fig. 8, 8a.

*E. Testá ovatá, spirá elatá, pyramidatá, apice acuminato, anfractibus (4) angulatis; angulo in carinam obtusam producto; anfractibus superne tabulatis, inferne planis, aperturá ovatá, basi rotundatá, fissurá angustá.*

Shell ovate, spire elevated, pyramidal, apex pointed, whorls (4) angulated, the angle forming an obtuse carina; upper surface of the whorls tabulated, lower flattened, aperture ovate, base rounded, umbilical fissure narrow.

In this species the spire and aperture are nearly of equal length, beneath the angle of the body whorl a slight depression is perceptible; the flattened upper area of the whorls is narrow compared with the other contemporaneous species.

*Locality.* Minchinhampton. It occurs in the planking, and is rare.

**EUSPIRA CORONATA.** Plate VI, fig. 9.

*E. Testá subgloboá, spirá elatá, anfractibus (4—5) angulatis, angulis nodulatis; nodulis numerosis; anfractibus superne tabulatis, inferne subplanis; anfractu ultimo globoso, carinis duobus nodosis cincto; aperturá magná ellipticá, basi rotundatá; umbilico parvo.*

Shell subglobose, spire elevated, whorls (4—5) angulated, the angles nodulated, the nodules being small and numerous; the whorls are flattened above and beneath the angle; the last whorl is globose, and has two encircling nodulous carinae, with a depression between them; the aperture is large and elliptical; the base rounded and wide; the pillar lip with an open umbilicus.

This may be regarded as an aberrant form of *Euspira*, in which the carina becomes nodulous; the nodules, however, are not prominent nor large, those of the second carina being smaller, more numerous, and rather indistinct. There is also a slight sulcus between the carinae which are connected together by obscure elevations, but these merely appear as slight plications. The general form being globose, and the carina broken into nodules, renders its aspect less angular than is usual in the genus. Length 21 lines, breadth 19 lines.

*Locality.* Minchinhampton: the planking has furnished our only example.

#### EUSPIRA SUBCANALICULATA. Plate VI, fig. 13.

*E. Testá oblongá; spirá sub-erectá; anfractibus (4) angulosis, marginibus subdepressis, supernè tabulatis, infernè subconvexis; anfractu ultimo obliquo; aperturá subtrigóná; obliquá, basi angustatá; labro interno calloso umbilicem obtigente.*

Shell oblong; spire but little elevated; whorls (4) angulated, their margins rather depressed, flattened above the angle, and rather convex beneath; the last whorl oblique; aperture subtrigonal, the last whorl oblique, the base narrow; the inner lip thickened, and covering an umbilicus.

Unfortunately we possess only one specimen of this little shell, which was obtained in the planking; it may possibly be a young variety of *E. canaliculata*, in which the upper portions of the whorls may become channelled with advance of growth, and the general figure more globose; the appearance of the inner lip and umbilicus, however, are certainly different; and we, therefore, prefer to keep this as a distinct species. Length 8 lines, breadth 7 lines.

*Locality.* Minchinhampton.

#### Family—PYRAMIDELLIDÆ.

##### EULIMA, *Risso*. 1826.

Turreted, smooth, pyramidal; spire long, consisting of numerous whorls; apex acute, slightly tortuous; aperture oval, rounded anteriorly; outer lip slightly thickened; columella smooth.

**EULIMA COMMUNIS.** Plate IX, figs. 21, 21a.

*E. Testá turrítá, lævigatá; spirá regulari, obtusá; anfractibus subplanis in ætate juniore, ætate progrediente convexis; aperturá ovatá; labro tenui.*

Shell turreted, smooth; spire regular, obtuse; whorls rather flattened in the young state, but with advanced age more convex; aperture ovate; lip thin.

When young the shell is much more flattened and obtuse; but in all stages of growth the junctions of the whorls are strongly marked—the oldest specimens have the lines of growth strongly developed upon the last volution. The contrast between the peculiar flatness and almost conical figure of the young shells and older specimens which have lost their apex is so great, that without the assistance of intermediate forms they would probably be regarded as distinct species. The length never exceeds an inch.

*Locality.* This is decidedly the most common univalve of the Great Oolite, and occurs in all the shelly beds, more especially in the soft shelly Oolite beneath the planking at Minchinhampton Common.

**EULIMA PYGMÆA.** Plate IX, fig. 1.

*E. Testá lævigatá, turrítá; spirá obtusá; anfractibus paucis, subplanis; aperturá subcontractá.*

Shell smooth, turreted; spire obtuse; whorls few, nearly flat; aperture oblique, and somewhat contracted laterally.

The last whorl is large, its length being half of that of the entire shell; the obtuseness of the spire, fewer volutions, nearly cylindrical figure, and obliquity of the aperture, separate it from *E. vagans*.

*Locality.* A single specimen is all we have met with: it occurred in the white stone of Bussage.

**EULIMA VAGANS.** Plate IX, figs. 3, 4.

*E. Testá turrítá, lævi, elatá; spirá acutá, anfractibus paucis subplanis; aperturá ovatá; labro dextro subexpanso.*

Shell turreted, smooth, elevated; spire acute; whorls few, high, and nearly flat; aperture ovate; right lip somewhat expanded.

The last whorl is nearly equal in length to all the others together.

*Locality.* It occurs in the shelly planking rarely; and a few casts have also been obtained in the upper portion of the formation, east of Minchinhampton.



**EULIMA SUBGLOBOSA.** Plate IX, fig. 6.

*E. Testá lævi, ovato-conicá; spirá subcontortá; anfractibus convexis, angustatis, anfractu ultimo subgloboso; aperturá obliquá, ovatá.*

Shell smooth, ovately conical; spire rather contorted; whorls convex, narrow, the last whorl subglobose; aperture oblique and ovate.

A small globose species, the spire of which is rather angular, its length being somewhat less than that of the last whorl.

*Locality.* It is rare, and occurs in the soft shelly Oolite of Minchinhampton Common.

**CHEMNITZIA, D'Orbigny. 1839.**

Shell turreted, elongated, not umbilicate; volutions numerous, frequently costulated; aperture oval or angular, anteriorly large, retracted posteriorly; columella straight and smooth; outer lip thin and smooth.

**CHEMNITZIA LONSDALEI.** Plate VIII, figs. 13, 13a.

*C. Testá turrítá, apice acuto, lævigato; anfractibus in medio profundè constrictis vel sulcatis, suturis vix impressis; aperturá, elongato-ovatá, superne constrictá.*

Shell turreted, elongated, acute, smooth; whorls deeply constricted, or sulcated in their middle part; sutures of the whorls sometimes scarcely distinguishable; aperture elongated and ovate, narrow posteriorly.

For the first four volutions the mesial depression is but slightly marked; but it gradually increases in depth, the last two or three whorls being deeply grooved. Several oolitic species approach this shell, more especially the *Melania lineata* of the Mineral Conchology and the *M. procerá* of Deslongchamps; in the latter species, however, the concavity of the whorls is always very slight, and is sometimes not appreciable. Axis 3 inches 3 lines; transverse diameter 10 lines; length of aperture 10 lines; breadth of aperture 5 lines.

*Locality.* Our species is moderately rare; it has been found only in the planking of Minchinhampton Common.

Named after W. Lonsdale, Esq., F.G.S., whose valued contributions to Geology, especially among the oolitic series, are well known.

**CHEMNITZIA SIMPLEX.** Plate VII, fig. 15.

*C. Testá magná, turrítá, elongatá, lævi; anfractibus convexis, suturis profunde impressis, aperturá obliquá ovatá; columellá marginatá, rotundatá, subrectá; labro interno effuso.*

Shell turreted, elongated, smooth; whorls convex, the sutures deeply impressed, aperture oblique, ovate; columella margined, rounded, nearly straight; inner lip effuse.

In this large species the volutions are high and globose, the base of the shell is rather contracted.

*Locality.* The few specimens found, have been obtained from the planking; the fine example figured is from the hard weatherstone of Bisley Common.

CHEMNITZIA HAMPTONENSIS. Plate VII, figs. 1, 1a.

*C. Testá elongato-conicá, spirá mediocriter obtusá; anfractibus (10—11) planis et costatis; costis longitudinalibus (20—22) numerosis, rectis, vel subflexuosis; aperturá parvâ, ellipticâ.*

Shell conical, but much elongated; spire, with the apex, somewhat obtuse; whorls (10—11) flattened and costated; costæ numerous, perpendicular, but slightly bent in the middle, inclining from left to right; aperture small, and elliptical.

The whorls are narrow, their axis being equal only to half their transverse diameter: the costæ are narrow, and moderately elevated in young specimens, but after seven volutions have been formed, became much more faintly marked, and finally are obsolete: the less subulate form and very narrow whorls separate it from *Terebra vetusta* (Phil. Geol. York., t. 9, f. 11), to which the markings upon its surface have a near resemblance. Axis of largest specimen 15 lines; transverse diameter 5 lines.

*Locality.* Minchinhampton Common and vicinity, where it is moderately rare: it is usually found in the soft oolite beneath the planking.

CHEMNITZIA LECKENBYI. Plate VII, fig. 4.

*C. Testá parvâ, lævigatâ, subulatâ; anfractibus numerosis, subplanis, supernè convexis, anfractu ultimo symmetrico.*

Shell small, smooth, subulate, acute; whorls numerous, narrow, flattened, except upon their upper portions, where they are convex; the last whorl symmetrical.

This small species approaches in figure two contemporaneous species, viz., the young state of *Nerinea Voltzii* and of *Eulima? communis*; from the former of these it is distinguished by the greater flatness of the whorls; from the young state of the latter by the much greater number of whorls, more subulate form, and acute apex. Axis  $3\frac{1}{2}$  lines.

*Locality.* Minchinhampton Common.

CHEMNITZIA WETHERELLIJ. Plate VII, figs. 5, 5a.

*C. Testá cylindrico-elongata; anfractibus numerosis (12) subconvexis, longitudinaliter costatis; costis (14) rectis obtusis; aperturâ parvâ, ovatâ.*

Shell cylindrical, elongated, whorls numerous (about 12), somewhat convex, longitudinally costated; costæ perpendicular, obtuse, closely arranged, about 14 in a volution; aperture small, ovate.

A small, slender species, with closely-arranged costæ, which are rather large, but not much elevated; the sutures of the whorls are strongly marked; it is rare, but has occurred in more than one of the shelly beds. Axis 10 lines; transverse diameter 2 lines.

*Locality.* Minchinhampton Common.

This species is named in compliment to our kind and liberal friend, N. T. Wetherell, Esq., F.G.S.

CHEMNITZIA VARIABILIS. Plate VIII, figs. 7, 7*a*, *b*.

*C. Testá turrítá, subulatá; anfractibus convexiusculis, transversim striatis, plus minusve crenulatis, longitudinaliter costatis, costis curvatis circa 12 in ambitu; costis interdum interruptis nodulosis; aperturá ellipticá obliquá; columellá marginatá.*

Shell turreted, subulate; whorls rather convex, transversely striated, striae more or less longitudinally costated, costæ curved, about 12 in a volution; ribs sometimes obsolete, and replaced by nodules; aperture elliptical, oblique; columella marginated.

Specimens differ in the convexity of the whorls, those which are most convex have the ribs shortest, or reduced merely to nodules placed upon the upper border of each whorl: in all specimens the costæ become obsolete before reaching the base of each whorl. Occasionally upon the same specimen the ribs degenerate into nodules, only the smaller whorls are then costated. This species was first mistaken for *Melania undulata* (Deslongchamps), but in that shell the sides of the volutions are flat, the costæ are more numerous, and extend to the junction of the whorls, and have no curvature except in the last one; they are likewise less subulate than in our species. Axis 5 lines; transverse diameter  $1\frac{1}{2}$  lines.

*Locality.* It is abundant in all the shelly beds of the Great Oolite, near Minchinhampton.

CHEMNITZIA PHASIANOIDES. Plate IX, fig. 5.

*C. Testá ovato-subcylindricá, spirá elatá, apice obtuso; anfractibus (5) planis, anfractu ultimo subcylindrico, elongato; aperturá obliquá; labro dilatato.*

Shell ovately-subcylindrical, spire elevated, apex obtuse, whorls (5) flattened, the last whorl subcylindrical, elongated; aperture oblique; outer lip dilated.

This species has a considerable resemblance to *Eulima vagans*, but the spire is much shorter, the whorls are fewer, and the apex is more obtuse; the aperture is rather narrow, its length being two fifths of the entire shell.

*Locality.* The planking of Minchinhampton Common has furnished our specimens.



*Family*—LITTORINIDÆ.RISSOINA, *D'Orbigny*. 1842.

Shell turreted, acuminate; spire long, consisting of several whorls; aperture oval, rather pointed at the two extremities; outer lip thickened, emarginated; columella rounded, straight.

RISSOINA DUPLICATA, *Sow.* Plate IX, fig. 10.

RISSEO DUPLICATA, *Sow.* 1829. Min. Con., t. 609, fig. 4.

— — *Brown.* Illust. Foss. Conch., t. 38, figs. 14, 15.

— — *Morris.* Cat. Brit. Fossils, p. 161.

— — *Bronn.* Index Palæont., p. 1092.

RISSEOINA DUPLICATA, *D'Orb.* Prod. Paléont., p. 297.

— — *D'Orb.* Pal. Franç. Terr. Jurass., t. 237, figs. 1, 2.

*A. Testá parvâ turritâ, acutâ; anfractibus (6) in medio angulatis; costulis longitudinalibus angustatis, remotiusculis; carinâ unicâ in medio anfractuum sitâ; anfractu ultimo, costulis numerosis longitudinalibus rectis ornato, carinâ evanescente.*

Shell small, turreted, acute; whorls (6) angulated, with remote, narrow, longitudinal costæ; each whorl has a low carina, situated a little beneath its middle part; the last whorl has very numerous small, longitudinal and straight ribs; the carina is scarcely discernible upon the last whorl. The costæ upon the last whorl are twice as numerous as upon the spire, and the figure of the whorl is nearly cylindrical, or slightly biangulated; and the carina becomes obsolete; the *Rissoa unicarina* of Buvignier, and the *Fusus carinatus* of Roëmer, approach very nearly to this species, with which they may possibly be identical; judging from the descriptions, however, there are certain points of distinction which appear to separate them from our species. Length 2 lines.

*Locality.* Ancliff and Minchinhampton Common; at the latter place it is very rare, and found only in the beds of planking.

RISSEOINA OBLIQUATA, *Sow.* Plate IX, fig. 19.

RISSEOINA OBLIQUATA, *Sow.* 1829. Min. Con., t. 609, fig. 3.

— — *Brown.* Illust. Foss. Conch., p. 79, t. 38, figs. 19, 20.

— — *Bronn.* Index Palæont., p. 1093.

RISSEOINA OBLIQUATA, *D'Orb.* Prod. Paléont., p. 297.

*R. Testâ turritâ, turbinatâ, acutâ; anfractibus (6—7) convexis et costatis; costis à dextro ad sinistram obliquis.*

Shell turreted, turbinated, acute; whorls (6—7) convex and costated; costæ oblique, directed from right to left.

The costæ are rather more elevated than in *R. acuta*, and the entire figure is more turbiniform, the whorls being much more convex. Length from  $2\frac{1}{2}$  to 3 lines.

*Locality.* Ancliff; also very rarely at Minchinhampton Common, in the planking.

*RISSOINA ACUTA*, Sow. Plate IX, fig. 9.

*RISSOA ACUTA*, Sow. 1829. Min. Con., t. 609, fig. 2.

— — *Brown.* Illust. Foss. Conch., p. 79, t. 38, figs. 25, 26.

— — *Bronn.* Index Palæont., p. 1090.

*RISSOINA ACUTA*, D'Orb. Prod. Paléont., p. 297.

*R. Testá parvá, turritá, acutá; anfractibus convexiusculis 6, costulis angustatis subremotis longitudinalibus; aperturá ovatá; labio dextro expanso.*

Shell small, turreted, acute; whorls (6) slightly convex, with narrow, rather remote, longitudinal ribs; aperture oval; right lip expanded.

The surface is nearly smooth; the longitudinal ribs, or rather lines, scarcely affecting the evenness of the surface; it is the most slender example of the genus which the Great Oolite has produced. Length, 3 lines.

*Locality.* Ancliff; and very rarely Minchinhampton Common, in the planking.

*RISSOINA CANCELLATA.* Plate IX, figs. 12, 12a.

*R. Testá turbinatá, turritá, acutá; anfractibus convexis (8), angustis, transversè costatis; costis (6—7) inæqualibus, lineis longitudinalibus decussatis; aperturá latá.*

Shell turreted, turbinated, acute; whorls convex (8), narrow, transversely costated; costæ (6—7) unequal, decussated by longitudinal lines; aperture wide.

The upper costæ of each whorl are smaller and more approximated than the lower; the convexity of the whorls is chiefly upon their lower portions; the fine longitudinal lines crossing the narrow encircling costæ give to the surface a cancellated aspect; the aperture is acute above, rounded beneath.

*Locality.* The soft Oolite beneath the planking of Minchinhampton Common furnished this pretty little shell, of which we have not seen another example.

*RISSOINA TRICARINATA.* Plate IX, fig. 13.

*R. Testá parvá, turbinatá, acutá; anfractibus convexis; tricarinatis; carinis crenulatis; cariná superiore apud suturam positá; aliis in medio et approximatis; anfractu ultimo ad basem lineis tenuissimis notato; aperturá parvá, suborbiculari.*

Shell small, turbinated, acute; whorls very convex, and thrice carinated; carinæ crenulated, the upper one placed near to the suture; the others about the middle of the whorl, and near together; the last whorl has near to its base very fine encircling lines; the aperture is small, and nearly orbicular.

In this minute shell the largeness and roundness of the carinæ, and the great convexity of the whorls are the most prominent features.

*Locality.* We have procured two specimens from the white stone of Bussage; but in this, and probably other instances of minute shells, the small number known may indicate rather our defective observation than the true relative numbers which they present.

RISSOINA? LÆVIS, *Sow.* Plate IX, fig. 16.

RISSOA LÆVIS, *Sow.* 1829. *Min. Con.*, t. 609, fig. 1.

— — *Brown.* *Illust. Foss. Conch.*, p. 79, t. 38, fig. 12.

— — *Bronn.* *Index Paleont.*, p. 1092.

*R. Testá parvá, turritá, lævi, subcylindricá; anfractibus (6) subplanatis; anfractu penultimo, et ultimo subcylindrico; aperturá parvá, obliquá.*

Shell small, turreted, pointed, smooth, and subcylindrical; whorls (6) rather flattened; the last whorl, and also the penultimate whorl, are nearly cylindrical; aperture small and oval, oblique. Length  $2\frac{1}{2}$  and 3 lines.

*Locality.* Ancliff; also very rarely at Minchinhampton Common, where it has been found in the planking.

This species scarcely exhibits the anterior notch characteristic of *Rissoina*.

### PAGODUS, *Gray.*

*Sub-genus*—AMBERLYA.

*P. Testá turritá, turbinatá, apice aculo; anfractibus supernè planis, infra convexis et nodulatis; anfractu ultimo ventricosó; aperturá ovatá, integrá, labio interno calloso umbilicó viæ obliquante; suturis profundè impressis; columellá nullá.*

Shell turreted, turbinated, apex acute; whorls flattened above, convex, and nodulated beneath, the last whorl ventricose; aperture ovate, entire; inner lip thickened, and nearly covering a small umbilicus; sutures deeply impressed; no columella.

The whorls are received into the concavity of those which succeed, the latter at their junctions being slightly overwrapped by the former, after the manner of *Scalaria*; the aperture is oval and oblique; the outer lip thin; the figure varied somewhat according to the stage of growth, the last one or two volutions in adult specimens becoming more tumid than the others; in such examples, therefore, the spire acquires a slightly concave figure.



This shell may be considered to form only a section of *Littorina*, agreeing in the general characters with the genus *Pagodus* of Gray, with which, probably, the discovery of more perfect specimens may assimilate it.

AMBERLEYA (PAGODUS) NODOSA. Plate V, fig. 19.

TEREBRA NODOSA, *Buckman*. 1845. *Geol. of Cheltenham*, p. 102.

*A. Testá turritá, ventricosá; spirá elatá, apice acuto; anfractibus (6) infra nodulosis, nodulis numerosis supernè apud suturam cingulo nodulorum minorum ornatis; anfractu ultimo basi costulis obscuris tribus cincto.*

Shell turreted, ventricose; spire elevated; apex acute; whorls (6) convex on their lower portions, and nodulated; the nodules closely arranged, and forming a small belt near to the base of the whorl; another, much smaller and indistinct, circle of nodules encompasses the whorls upon their upper portions near to the suture; the last whorl has at its base three indistinct, narrow, encircling costæ.

The number of nodules gradually increases in each volution, the last whorl having about 18; the last two volutions are very ventricose, which give to the spire a slightly concave figure; in the younger state, consequently, the figure is more slender than in the adult. Our two specimens, which are of different stages of growth, present the following proportions:—*Adult*. Axis 24 lines, transverse diameter 15 lines, length of aperture 11 lines, breadth of aperture 8 lines. *Young state*. Axis 16 lines, transverse diameter 9 lines, length of aperture 6 lines, breadth  $4\frac{1}{2}$  lines.

*Locality*. It is very rare, the planking of Minchinhampton Common has furnished five examples, and several imperfect casts have been obtained in the Stonesfield slate at another place in the same vicinity: these casts have enabled us to ascertain the absence of a central columella.

*Obs*. The specimen submitted to the artist was rather imperfect at the base of the aperture, which, together with the position, give it the aspect of a regular notch at that part of the shell.

*Family*—NERITIDÆ.

NERITA, *Linn*. 1758.

Shell semiglobose; spire short, sometimes not produced, consisting of few volutions; aperture large, semilunar; outer lip thick, inner lip thickened, usually flattened, and striated or dentated at its inner edge.

The fossil species of *Nerita*, from the Great Oolite, may be divided into the three following sections, as dependent on the character of the inner lip:—

## SECT. 1. Inner lip smooth.

*N. Testá crassá, subhemisphæricá; spirá parvá obliquá, depressá; anfractibus paucis, carinatis; aperturá semilunari; labio dextro crasso, labio interno planato, amplo.*

Shell thick, subhemispherical; spire small, oblique, depressed; whorls few, carinated; aperture semilunar; outer lip thick and smooth; inner lip flat, broad, and smooth, without notch or striæ.

## NERITA CANCELLATA. Plate XI, fig. 15, 15a.

*N. Testá crassá, hemisphæricá; spirá parvá, depressá, obtusá; anfractibus (3) carinis tribus cancellatis; carinis obtusis, striis longitudinalibus decussatis, et lineis inæqualibus et irregularibus cinctis; aperturá transversè oblongá.*

Shell thick, hemispherical; spire small, obtuse, depressed; whorls (3), with three carinæ cancellated; carinæ obtuse, decussated with longitudinal striæ: the last whorl has also irregular, unequal, encircling lines, which form, with the longitudinal striæ, a cancellated surface; aperture transversely oblong; inner lip very wide.

The most frequent aspect is that of a very rugose, depressed *Nerite*, with large, obtuse carinæ and intermediate sulcations; the distinctly cancellated surface is observable only in the younger examples. The first and second carinæ are placed near together; between these and the basal carina is a large surface, with encircling lines crossing the striæ. Portions of coloured surface are sometimes observed upon the carinæ and upper portion of the last volution.

*Locality.* It is moderately rare at Minchinhampton Common and Bussage.

## NERITA RUGOSA. Plate XI, fig. 17, 17a.

*R. Testá hemisphæricá; spirá parvá, depressá; anfractibus (2 vel 3) carinato-striatis; ultimo anfractu subangulato, carinis tribus (cariná mesá majore), et striis profundis longitudinalibus plùs minùsve crebris; coloribus fuscis sæpè pictis; labio interno, lato, planato.*

Shell hemispherical; spire small, depressed; whorls (2 or 3) carinated and striated; the last whorl subangulated, having three carinæ, of which the middle one is the most prominent and rounded; the last whorl has, also, longitudinal, deeply-marked striæ, more or less closely arranged, and not unfrequently marked with colours, arranged into two broad encircling bands, separated by the mesial carina.

The longitudinal striæ might sometimes, with more propriety, be termed costæ; when the costæ are large and distant the carinæ are likewise most prominent, and occasionally both conditions may be observed in the growth of the same specimen—the smaller

examples being such as usually have the most widely-separated longitudinal lines or striæ. The surface markings vary so considerably that they may be conveniently described under the three following aspects:—

*a'*. Ribs elevated and separated; carinæ smooth and prominent.

*b'*. Surface with longitudinal closely-arranged plications, but no distinct ribs; plicæ impressed with very fine longitudinal lines.

*c'*. In which the characteristics of the two former varieties are sometimes exhibited upon the same specimen, in which case the carinæ are imperfect, or, in lieu of them, there are slight depressions or furrows.

The most common aspect is that of the variety *a'*. It is one of the most generally-noticed univalves of the shelly beds. Very rarely all traces of ribs and plications are wanting, the surface is then shining, smooth, and highly coloured. The dimensions vary from that of a duck-shot to the largest-sized pea.

*Locality.* Minchinhampton Common. In all the shelly beds of the district.

NERITA COSTULATA, *Desh.* Plate VIII, figs. 6, 6*a*, *b*, *c*. Plate XI, figs. 18, 18*a*, *b*.

NERITA COSTATA, *Sow.* 1824. *Min. Con.*, t. 463, figs. 5, 6.

— — *Phillips.* *Geol. of Yorkshire*, vol. i, t. 11, fig. 32.

— — *Brown.* *Illust. Foss. Conch.*, p. 91, t. 44, figs. 1, 2.

— COSTULATA, *Desh.* 1838. *Lam. Anim. sans Vert.*, 2d Edit., vol. viii, p. 617.

— — *D'Orb.* 1850. *Prod. Paléont.*, p. 299.

*N. Testá parvá; spirá obliquá depressá, minutá, vie elatá; anfractu ultimo superne planato, costis longitudinalibus, numerosis, subundatis, et approximatis ornato.*

Shell small; spire oblique, depressed, minute, scarcely elevated; the last whorl flattened upon its upper portion, and covered with costæ, which are longitudinal, numerous, closely arranged, and slightly waved; the aperture is very large, the inner lip very wide and flat.

The absence of carinæ at once distinguishes this little shell from our *Nerita rugosa*, for one variety of which it might otherwise be mistaken. It has not been found in the Minchinhampton Great Oolite, but occurs occasionally in the Inferior Oolite of that district. Axis 2 lines.

*Locality.* Ancliff; Stonesfield. *Inf. Ool.*, Yorkshire.

## SECT. 2. Inner lip convex. Neridomus.

*N. Testá lævigatá, ovato-globosá; spirá parvá, obliquá; anfractu ultimo permagno; aperturá ovatá, vel semilunari; labio externo crasso; labio interno crasso, convexo et lævigato.*

Shell smooth, ovately globose; spire small, oblique; the last whorl very large; aperture ovate, or semilunar; outer lip thick; inner lip thick, convex, and smooth.



NERITA HEMISPHERICA, Roëmer. Plate XI, fig. 16, 16a; 14, 14a.

NERITA HEMISPHERICA, Roëmer. 1836. Nordd. Oolith., p. 156, t. 10, fig. 7.

*N. Testá lævigatá, transversá ovali-hemisphæricá; spirá parvá, prominulá; aperturá semilunari; labio interno magno, convexo et incrassato.*

Shell smooth, transverse, ovately hemispherical; spire small; aperture semilunar; inner lip large, convex, and incrassated.

The surface of this species varies considerably; the younger specimens being smooth, and not unfrequently exhibiting portions of colouring in dark, encircling lines: the older specimens are rendered rugose by numerous large plications of growth. It is not uncommon, being found in all the shelly beds, more especially in the coarse planking.

*Locality.* Minchinhampton Common.

NERITA MINUTA, Sow. Plate XI, figs. 19, 19a.

NERITA MINUTA, Sow. 1824. Min. Con. t. 463, figs. 3, 4.

— — Desh., 1838. Lam. Anim. sans Vert., 2d Edit., vol. viii, p. 617.

— — D'Orb. 1850. Prod. Paléont., p. 299.

— PULLA, Roëmer. 1836. Nordd. Oolith., p. 155, t. 9, fig. 30.

— OVATA, Roëmer. Nordd. Oolith., p. 156, t. 10, fig. 6.

— MAIS, Burignier. 1843. Mém. Soc. Phil. Verd., t. 5, figs. 18, 19.

*N. Testá parvá lævigatá; spirá obliquá exertá et minutá; anfractu ultimo coloribus lineatis undulatis sæpissimè picto.*

Shell small, smooth; spire oblique and minute; the last whorl most commonly exhibits undulating-coloured lines, which occasionally coalesce, and are very irregular.

This little shell is a longer oval figure than both *Nerita hemisphærica* (Röm.) and *Neritina Cooksoni* (Desl.); the latter little species, with which it nearly agrees in size, is more globose, and has a larger, more prominent, and less oblique spire than *N. Pulla*.

*N. minuta* occurs abundantly in all the shelly beds; its surface is very smooth and shining; the most frequent size is that of duck shot; the longer diameter not exceeding two lines.

*Locality.* Minchinhampton Common and neighbouring district.

SECT. 3. Inner lip notched. *Neritopsis, Grateloup.* 1840.

*N. Testá crassá, neritiformi, ovato-globosá; spirá parvá, obliquá, anfractu ultimo inflato, costis numerosis cincto; aperturá suborbiculari, labro externo incrassato et lævigato, labio interno concavo, sulco lato margine excavato.*

Shell thick, neritiform, ovately-globose; spire small, oblique; the last whorl inflated, encircled with numerous costæ; aperture suborbicular; the outer lip thickened, but smooth; the inner lip concave, with a wide notch upon its inner border.

NERITOPSIS STRIATA. Plate XI, figs. 13, 13a.

*N. Testá ovatá; spirá elatá; anfractibus tribus, convexis; anfractu ultimo costis numerosissimis crebris cincto, costis subundulatis; aperturá amplá, ovatá.*

Shell ovate; spire elevated; whorls (3) convex; the last whorl encircled with numerous and closely-arranged costæ, which slightly undulate; aperture large and ovate.

The costæ are narrow, but slightly elevated, the interstitial spaces being so narrow as to appear like striæ; hence, in badly-preserved specimens, the costæ can scarcely be discerned; the spire is small, moderately prominent, and has its surface distinctly sculptured in good examples: the specimen figured is rather beneath the average size.

*Locality.* Minchinhampton Common, where it occurs somewhat rarely in the soft, shelly oolite which underlies the planking.

NERITOPSIS SULCOSA. Plate XI, fig. 12.

? NERITA SULCOSA, *Archiac.* 1843. *Mém. Soc. Géol. Fr.*, vol. v, tab. 28, fig. 8. (Non *Brocchi.*)

*N. Testá ovatá; spirá parvá; anfractibus tribus vel quaternis, convexis, sulco lato spirali supernè instructis; anfractu ultimo permagno, cingulis inæqualibus, numerosis, et magnis ornato.*

Shell ovate; spire small; whorls (3 or 4) convex, with a wide, encircling sulcus upon their upper portions; the last whorl very large, with numerous, unequal, and large encircling bands.

The encircling ribs extend only upon the last volution, their inequality and large size give to the surface a rugose aspect; the sulcus upon the upper part of the last whorl is without costæ; the specimen figured is of the largest dimensions.

*Locality.* Minchinhampton Common, where it occurs somewhat rarely in the shelly beds of coarse planking.

PILEOLUS, *G. B. Sowerby*, 1823.

"Shell conical, with a subcentral upright vertex; base concave, with a thin margin and tumid centre; aperture small, within the margin of the base, sublateral, semilunar, its outer lip prominent, the inner one crenulated; spire internal, very short."—*Sowerby*.

**PILEOLUS PLICATUS, Sow.** Plate IX, figs. 36, 36*a*, *b*, *c*.

**PILEOLUS PLICATUS, G. B. Sow.** 1823. Genera of Shells, No. 19, figs. 1—4.

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|---|---|--|
| — | — | <i>Sow.</i> Min. Con., t. 432, figs. 1—4.          |
| — | — | <i>Bronn.</i> Leth. Geogn., p. 392, t. 27, fig. 6. |
| — | — | <i>Brown.</i> Illust. Foss. Conch., p. 92.         |
| — | — | <i>D'Orb.</i> 1850. Prod. Paléont., p. 299.        |
| — | — | <i>Bronn.</i> Index Palæont., p. 973.              |

**PATELLA COSTATULA, Goldfuss.** Petref., t. 177, fig. 9.

*P. Testá turbinatá; ambitu orbiculari; verticè elato, subacuto, erecto; costis radiantibus majoribus (16) acutis, minoribus intermediis; costis posterioribus maximis; margine dentatá; basi in medio convexiusculá, ad peripheriam subconvexá; peripheriá integrá aut subsinuatá.*

Shell turbinated, suborbicular, summit elevated, erect, and rather acute; ribs radiating, the larger series (16 in number) are acute, with smaller ones between them; the posterior ribs are the largest and most distant; the margin is toothed, the base is convex in its middle part, and slightly convex at the periphery; the periphery is entire, and slightly sinuated.

Four of the posterior ribs occupy one third of the circumference; they are more elevated and distant than the others. The specimens of this species in the Great Oolite never occur of so large a size as those of *P. lævis*; the usual basal diameter being about 3 lines, and very rarely exceeding 4 lines. *Pileolus plicatus* is scattered, indifferently, over the shelly beds, but in fewer numbers than the other species; the shell being very thick and strong, is usually entire and uncompressed; both species are always found in the upright position.

*Locality.* Minchinhampton Common; Ancliff, Wiltshire; Langrune, France.

**PILEOLUS LÆVIS, G. B. Sow.** Plate IX, figs. 37, 37*a*, *b*.

**PILEOLUS LÆVIS, G. B. Sow.** 1823. Genera of Shells, No. 19, figs. 5—8.

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|---|---|---|
| — | — | <i>Sow.</i> Min. Con., t. 432, figs. 6—8.                       |
| — | — | <i>Brown.</i> Illust. Foss. Conch., p. 92, t. 44, figs. 16, 17. |
| — | — | <i>D'Orb.</i> 1850. Prod. Paléont., p. 299.                     |
| — | — | <i>Bronn.</i> 1848. Index Palæont., p. 973.                     |

? **PATELLA MAMILLARIS, Goldfuss.** Petref., t. 177, fig. 10.

? — **PAPYRACEA, Bronn.** Lethæa Geogn., pl. 27, figs. 7, *a*, *b*.

*P. Testá parvâ, conico-depressâ, lævi, aut sulcis raris, obsoletis notatâ; basi in medio convexiusculâ.*

Shell small, conical, but much depressed; sometimes discoidal, smooth, or with a few faintly-marked longitudinal irregular sulcations; base rather convex in the middle part.



Specimens, as small as the head of a pin, are scattered over the blocks of white stone at Bussage, and planking at Minchinhampton Common—these are smooth. The larger shells are more distinctly sulcated, and occasionally attain a diameter of three eighths of an inch.

*Locality.* It occurs in all the shelly beds at Minchinhampton; at Ancliff, in Wiltshire; and at Charter House, Hinton, Somersetshire. Langrune, France.

*Family*—TURBINIDÆ.

TROCHUS, *Linnaeus*, 1758.

Shell turbinated, conical; spire elevated, consisting of numerous whorls; under surface discoidal; aperture more or less depressed obliquely, entire, generally angular; columella curved, more or less prominent at its union with the outer lip, contiguous to the axis of the shell.

The fossil species of the Great Oolite are all very small, and are tolerably numerous in the shelly beds.

TROCHUS DUNKERI. Plate X, figs. 3, 3a.

*T. Testâ conicâ, glabrâ; anfractibus lævigatis et planis (4—6); apice acuto; aperturâ obliquâ, umbilico nullo.*

Shell conical, smooth; whorls very smooth and flattened; apex acute; aperture oblique; no umbilicus.

The extreme flatness of the whorls, and moderate elevation of the spire, are the chief features; the good specimens have oblique lines of growth upon the last whorl, near to the aperture.

*Locality.* This little species is tolerably abundant in the white stone of Eastcombs and Bussage.

Named after Dr. W. Dunker, Professor at the Polytechnic School of Cassel.

This species has some affinity with the *Trochus glaber*, Koch (*Goldf. Pet.* t. 1796. 12); but the volutions are striated and the base more convex.

TROCHUS PLICATUS, *Archiac.* Plate X, figs. 8, 8a.

TROCHUS PLICATUS,	<i>Archiac.</i>	1843.	Mém. Soc. Géol. France, vol. v, p. 379, t. 29, fig. 5.
—	—	<i>D'Orb.</i>	1850. Prod. Paléont., p. 300.
—	—	<i>Bronn.</i>	1848. Index Palæont., p. 1304.

*T. Testá turbinatá; spirá elatá; anfractibus (5) subconvexis, longitudinaliter costatis; costis 12 rectis elatis; basi lævi; aperturá parvâ, depressâ.*

Shell turbinated; spire elevated; whorls (5) rather convex, longitudinally costated; costæ straight, elevated, smooth, about 12 in a volution; the base smooth; the aperture small and depressed; the sutures of the whorls are strongly marked. Axis 3 lines, basal diameter 6 lines.

*Locality.* The specimen figured is rather flattened; it occurred in the planking of Minchinhampton Common, and is more acutely conical than that figured by M. d'Archiac, of which it is considered to be only a variety.

TROCHUS IBBETSONI. Plate X, figs. 4, 4a.

*T. Testá conicâ, spirâ elatâ, obtusâ; anfractibus (5—6), lævigatis et planis, aut subconvexis; aperturâ depressâ, obliquâ; umbilico nullo.*

Shell conical; spire elevated, obtuse; whorls (5—6) smooth and flattened, or slightly convex; aperture depressed, oblique; no umbilicus, columella lip thick and excavated.

This species somewhat resembles *T. Dunkeri*, from which it differs in the more elevated spire, obtuse apex, and somewhat convex form of the whorls; the base is, likewise, more convex and narrow: in the larger specimens these distinctive characters become more prominent, and the sutures of the whorls are strongly marked. It occurs together with *T. Dunkeri*, but in smaller numbers.

*Locality.* Eastscombs and Bussage.

The name in compliment to Capt. L. L. B. Ibbetson, F.R.S., whose geological surveys of the different railways have been of considerable interest to science.

TROCHUS SQUAMIGER. Plate X, figs. 2, 2a, b.

*T. Testá conicâ; apice obtuso; anfractibus (6—8) subcompressis, suturis impressis; anfractibus cingulis quaternis tubuloso-squamosis; cingulo inferiori minimo; basi planâ et lævi; aperturâ depressâ; umbilico nullo.*

Shell conical; apex obtuse; whorls (6) rather compressed, the sutures well marked; whorls with four circles of nodules or plications which are squamosely tubular or excavated towards the aperture, the lowest circle of nodules being much the smallest; the base is flat and smooth; the aperture depressed; no umbilicus.

In this species the height exceeds the basal diameter. It occurs not very unfrequently in the planking, a rock which usually adheres very closely to shells, and the plications become entangled with the particles of stone, so as to render good specimens very rare.

*Locality.* Minchinhampton.

## TROCHUS BUNBURI. Plate X, fig. 1, 1a, 1b.

*T. Testá conicá; apice acuto; anfractibus (5) cingulatis; cingulis acutis inæqualibus, basi lævi; aperturá obliquá.*

Shell conical; spire acute; whorls (5) cingulated; encircling ribs unequal, and varying in different individuals; the base smooth; the aperture oblique.

The costæ are very large, elevated, and unequal, so as to obscure the sutures of the whorls.

*Locality.* It is by far the most abundant of the Great Oolite species in the vicinity of Minchinhampton, and is common to all the shelly beds.

This species is named in compliment to E. H. Bunbury, Esq., M.P., F.G.S.

## TROCHUS PILEOLUS. Plate X, figs. 5, 5a, 5b.

*T. Testá turbinatá, lævissimá; anfractibus (4) planis; apice obtuso; anfractu ultimo ad basin angulato; basi convexá; aperturá parvâ.*

Shell turbinated, very smooth; whorls (4) flattened; apex obtuse; the last whorl encircled with a prominent rib near to the base; base convex; aperture small.

The very obtuse spire, and nearly cylindrical form of the last volution, give to the shell a cap-like figure.

*Locality.* From the white stone of Bussage. It is rare.

## TROCHUS ANCEUS, Goldf. Plate X, figs. 7, 7a.

TROCHUS ANCEUS, Goldfuss. 1842. Petref., iii, p. 55, t. 180, fig. 3.

— — Bronn. 1848. Index Palæont., p. 1296.

*T. Testá turbinatá, parvâ, obliquè costatá, basi cingulatá; anfractibus (5—6) tetragonis cingulatis; cingulis quaternis granulatis.*

Shell small, turbinated, obliquely costated, base cingulated; whorls (5—6) angular, encircled with four rows of granules.

*Locality.* Of this minute shell we have only obtained two examples, from the white stone of Bussage, and believe it to be rare.

The sutures in the specimens, figured by Goldfuss, are more distinct.

## TROCHUS OBSOLETUS, Roemer. Plate XI, figs. 1, 1a.

TROCHUS OBSOLETUS, Roemer. 1836. Nordd. Oolith., p. 151, t. 11, fig. 5.

— — Bronn. 1848. Index Palæont., p. 1303.



*T. Testá conicá; anfractibus tribus lævibus, lateribus planis; umbilico nullo; aperturá depresso-ovatá.*

Shell conical; whorls (3) smooth, the sides flattened, no umbilicus; aperture depressed, ovate.

Possibly this may be the young of *T. glaber*, Dunker; the only apparent difference between them being, that *T. obsoletus* has a base wider in proportion to the height, and that the upper margins of the whorls are somewhat tumid, causing the sides to appear less flattened.

*Locality.* It is moderately common to all the shelly beds near Minchinhampton. In the Stonesfield slate of Wagboro' Bush (*Buckman*).

#### TURBO, *Linnæus*, 1758.

Shell thick, ventricose, turbinated, usually sculptured or tuberculated; spire short; aperture usually rounded, entire, somewhat spread out anteriorly.

#### TURBO HAMPTONENSIS. Plate IX, figs. 30, 30*a*, *b*.

*T. Testá parvá, turbinatá; anfractibus (4) convexis, costulis (4) granulatis elatis cinctis; aperturá orbiculatá; umbilico parvo.*

Shell small, turbinated; whorls convex (4), turreted, encircled by four ribs, which are elevated and closely granulated; the aperture is nearly round; the umbilicus small.

*Locality.* A single, good example from the planking of Minchinhampton Common is all we have seen.

#### TURBO ELABORATUS. *Bean*, MS. Plate IX, fig. 27.

TURBO ELABORATUS, *Lycett*. 1850. *Annals of Nat. Hist.*, vol. vi, p. 416, pl. 11, fig. 1.

*T. Testá conoidéa; anfractibus (4—5), supernè planatis, infernè subconvexis, et costatis; costis magnis longitudinalibus numerosis et elatis, lineisque transversis decussatis; aperturá ovatá; umbilico nullo.*

Shell conoidal; whorls (4—5), their upper borders flattened or nearly horizontal, smooth; their lower portions slightly convex, with numerous elevated large, longitudinal costæ, decussated by numerous, closely-arranged transverse lines; aperture oval; no umbilicus.

*Locality.* The planking of Minchinhampton Common and white stone of Bussage have furnished this species, but it is rare at both localities; it has, likewise, been obtained from the middle division of the Inferior Oolite in the same district, and occurs also in the same formation in Normandy.

## TURBO SHARPEI. Plate IX, figs. 28, 28a.

*T. Testâ conoidê; anfractibus (4) convexis, gradatim tumescentibus, suturis profundè impressis; anfractibus lineis elatis æqualibus, longitudinalibus et regularibus ornatis, aliis transversis decussatis; lineis transversis superuè distantibus, inferuè approximatis; apertura ovatâ; umbilico nullo.*

Shell conoidal; whorls (4) convex, gradually increasing in size, their sutures deeply impressed; the surface of the whorls is ornamented with numerous equal and regular longitudinal lines, transversely decussated by others of equal size; the transverse lines are arranged distantly upon the upper portions of the whorls, but more nearly upon the lower; aperture oval; no umbilicus.

Both descriptions of lines are scarcely discernible, except upon the last volution, where they are prominent; but the lower portion of this whorl is destitute of the longitudinal lines, which extend over only the upper half.

The general figure differs from *Turbo elaboratus* (Plate IX, fig. 27), in the more gradual increase of the whorls, which are likewise more convex, and have not the distinct sulcus or area upon their upper portions, nor the large elevated costæ; these distinctive features have been faithfully delineated by the artist. The longitudinal lines are equal in size to those which are transverse, forming a simple cross-barred surface.

*Locality.* It is rare; but has been found both at Bussage and Minchinhampton Common. This species is dedicated to D. Sharpe, Esq., F.R.S.

## TURBO PYGMÆUS. Plate IX, figs. 29, 29a.

*T. Testâ parvâ, conicâ; apice obtuso; anfractibus (4—5) planatis, costis longitudinalibus numerosis (circa 16 in ambitu), cum punctis interstitialibus ornatis; apertura depressâ.*

Shell small, conical, apex obtuse; whorls (4—5) flattened, ornamented with numerous longitudinal ribs (about 16 in a volution), the interstitial spaces being closely and deeply punctated; aperture depressed. The costæ are large and equal; their continuity is interrupted by a narrow, encircling band at the base of each whorl; the height of the entire shell is somewhat greater than its transverse diameter at the base; the exact character of the mouth not being exposed, it is placed only provisionally in the genus *Turbo*.

*Locality.* Minchinhampton Common, at which place it would seem to be rare.

## TURBO CAPITANEUS, Goldf. Plate IX, figs. 33, 33a.

TURBO CAPITANEUS, Goldfuss. 1842. Petref., iii, p. 97, t. 194, fig. 1.

— — — Bronn. 1848. Index Palæont., p. 1318.

*T. Testá turbinato-conicá, acutá, lineatá; basi granulatá cingulatá; anfractibus (6) subteretibus bicarinatis, carinis granulis erectis coronatis; interstitiis canaliculatis.*

Shell turbinated or conical; apex acute, the base with a granular band encircling it; the whorls (6) are turreted, and have two encircling carinæ, the carinæ are elevated and fringed with closely-arranged granules, the interstitial spaces are canaliculated.

*Locality.* This elegant species occurs rarely in the plinking of Minchinhampton Common; it is usually crushed or otherwise imperfect; it occurs likewise in the Inferior Oolite of Gloucestershire more frequently, and is usually better preserved.

We have ventured to assign this shell to the species described by Goldfuss, although its state of preservation does not show the longitudinal markings characteristic of that species.

**TURBO OBTUSUS, Sow.** Plate XI, figs. 9, 9a.

TURBO OBTUSUS, Sow. 1827. Min. Con., t. 551, fig. 2.

— — Brown. 1849. Illust. Foss. Conch., p. 73, t. 38, figs. 41, 42.

TURBO SUBOBTUSUS, D'Orb. 1850. Prod. Paléont., p. 300.

*T. Testá parvâ, conicâ; spirâ obtusa; anfractibus (4) planatis, ultimo supernè sub-concavo, infernè convexo, striis crebris, subundatis, transversis cincto; aperturâ ovatâ; umbilico nullo.*

Shell small, conical; spire obtuse; whorls 4, their sides flattened, the last whorl slightly concave in the upper and convex in its lower part; the whorls are encircled with striæ, closely arranged and slightly undulated; aperture ovate; no umbilicus.

In this minute species, the junctions of the whorls are strongly marked; the striæ are slightly punctated, giving to the spaces between them a rough or scabrous aspect; the striæ, however, are but faintly impressed, and are scarcely visible upon some specimens; the substance of the shell is thick, its axial slightly exceeding its transverse diameter, or being equal to about 2 lines.

*Locality.* Minchinhampton Common and Bussage. At both places it is somewhat rare, but occurs in more than one shelly bed. Ancliff, Wiltshire.

**TURBO GOMONDEI.** Plate XI, fig. 5.

*T. Testá conoides, spirâ elatâ, acutâ; anfractibus (5) planatis et costatis; costis transversis (4) densè nodulosis; aperturâ ovatâ, subdepressâ, umbilico nullo.*

Shell conoidal, spire elevated, acute; whorls (5) flattened and costated; the costæ (4 in number) are transversal, and densely nodulated; the aperture is ovate and somewhat depressed; and there is no umbilicus.

The length of the aperture is scarcely equal to half the entire length of the shell, and



somewhat exceeds its transverse diameter; it is moderately large, and wide at the base. the junctions of the whorls are strongly marked; the encircling costæ are large, closely arranged, and very densely nodulated. Axis 8 lines, transverse diameter of the last volution 6 lines.

*Locality.* Minchinhampton Common, where it occurs in the coarse planking: it is moderately rare.

We have dedicated this species to H. Gomonde, Esq., of Cheltenham, who has kindly allowed us the use of his collection of oolitic fossils.

MONODONTA, *Lamarek*. 1801.

Shell turbinated, aperture entire, base of the columella forming a tooth, with an exposed umbilicus half surrounding it; beneath the tooth is a longitudinal groove, the edges of which are acute; the outer lip is thick, striated within.

MONODONTA LYELLII, *Archiac*. Plate XI, figs. 4, 4a, b.

MONODONTA LYELLII, *Archiac*. 1843. Mém. Géol. Soc. France, tom. v, t. 29, fig. 8.

— — *Bronn*. 1848. Index Palæont., p. 742.

TURBO LYELLII, *D'Orb*. 1850. Prod. Paléont., p. 301.

*M. Testá turbinatá, spirá acutá, anfractibus (4) convexis, tricinctis; cingillis elatis et nodulosis; nodulis approximatis, antrorsum concavis; anfractu ultimo ventricoso, cingillis 7 ornato, ultimo cingillo maximo et profundè crenulato; umbilico magno.*

Shell turbinated; spire elevated, acute; whorls (4) convex, encircled with three carinae. carinae elevated and nodular; nodules placed close together, and concave on their anterior sides; the last whorl ventricose; encircling bands 7, the last being the largest and is deeply crenulated; the umbilicus is large.

The markings vary considerably in this species. In some specimens the encircling costæ are nearly smooth, in others they are merely notched; but the greater number are distinctly nodulated; the junctions of the whorls are deeply impressed; and the entire shell is very thick.

*Locality.* This shell is abundant in the shelly beds near Minchinhampton; the size varies from a diameter of 1 line to 5 lines. In the Great Oolite, Eparcy (*Lisieu*), France.

MONODONTA IMBRICATA. Plate XI, figs. 3, 3a.

*M. Testá parvâ, conicâ; spirâ acuminatâ; anfractibus subplanis; striis imbricatis, transversis (4) cinctis; anfractu ultimo ad basin subangulato.*

Shell small, conical; spire acuminate; whorls rather flattened, and encircled with four imbricated striæ; the last whorl is somewhat angulated towards its base.

The imbricated striæ are fine and closely arranged, those beneath the angle upon the last whorl are larger; the aperture is semilunar and contracted. As compared with *M. decussata*, this shell is more lengthened, the apex pointed, and the encircling striæ much fewer.

*Locality.* It is rare, and occurs, with the species before mentioned, at Minchinhampton.

MONODONTA FORMOSA. Plate XI, figs. 6, 6a, b.

*M. Testá turbinatá, spirá subdepressá, prominulá, obtusá; anfractu ultimo in medio carinato, striis transversis crebris tenuissimis cincto; cariná levigatá, rotundatá, obtusá, striis supra carinam positis magis elatis; aperturá semilunari subcontractá.*

Shell turbinated, spire rather depressed, small, obtuse; the last whorl carinated in its middle part; the carina smooth, rounded, and obtuse; the last whorl has likewise transverse, closely arranged, fine, and crenulated striæ, those above the mesial carina being larger than the others; aperture semilunar, somewhat contracted.

In the greater number of specimens, more especially those of large dimensions, the encircling striæ are obsolete, the only markings being the lines of growth. Diameter of largest specimens,  $4\frac{1}{2}$  lines.

*Locality.* It is abundant and common to all the shelly beds near Minchinhampton.

MONODONTA DECUSSATA. Plate XI, figs. 9, 9a.

*M. Testá parvâ, conicâ; apice obtuso; anfractibus planis, suturis impressis; striis crebris transversis et longitudinalibus decussatis.*

Shell small, conical; apex obtuse; whorls flattened, their sutures impressed, encircled with numerous transverse striæ, decussated and impressed by others longitudinally.

This shell is more obtuse than *M. imbricata*; the last whorl is more cylindrical than the others; the lines upon its surface are so delicate as to be scarcely visible, unless under a magnifier.

*Locality.* It is rare, and occurs with *M. imbricata*, in the soft shelly Oolite of Minchinhampton Common.

MONODONTA LABADYEI, *Archiac*, sp. Plate XI, fig. 2; var. fig. 11, 11a.

TROCHUS LABADYEI, *Archiac*. 1843. Mém. Soc. Géol. de France, iii, p. 379, t. 29, figs. 2, 2a.

TURBO — *D'Orb.* 1850. Prod. Paléont., p. 301.

? MONODONTA LEVIGATA, *Goldfuss*. Petref., p. 101, t. 195, fig. 5.

? TURBO DESLONGCHAMPSI, *Desh.* Elem. de Conchyl., t. 68, figs. 17, 18.

*M. Testá turbinato-conicá, lævi; spirá elatá, obtusá; anfractibus planis seu subconvexis; suturis vix impressis; anfráctu ultimo permagno; aperturá ovatá; umbilico nullo. Ætate adultá testá elatiore.*

Shell turbinated, conical, oblique, smooth; spire elevated, obtuse; whorls flattened, or slightly convex, the sutures rather indistinct; the last whorl very large; the aperture ovate, and the base without umbilicus or sulcus.

The young shells are rather discoidal, but with increase of growth gradually become obliquely conical, so much so, that the two extremes of the figure would scarcely be taken for the same species.

*Locality.* It is abundant in all the shelly beds of the Great Oolite formation near Minchinhampton. Eparcy, France.

SOLARIUM, *Lam.* 1801.

OMALAXIS. BIFRONTIA, *Deshayes.*

Shell depressed, conical, or discoidal; base concave, or widely umbilicated, the spiral margin of which is angulated and crenulated; aperture trapezoidal, with a thin peritreme.

SOLARIUM POLYGONIUM, *Archiac.* Plate IX, figs. 24, 24a, b.

SOLARIUM POLYGONIUM, *Archiac.* 1843. Mém. Soc. Géol. de France, tom. v, p. 378, pl. 29, fig. 1.

— — *Bronn.* 1848. Index Palæont., p. 1152.

— — *D'Orb.* 1850. Prod. Paléont., p. 300.

*S. Testá discoidéá, spirá parvá, anfractibus (4) planis, ultimo carinato; angulis (9) costatis; costis elatioribus; lineis transversis et longitudinalibus decussatis; cariná parvá, nodulosá propè suturam sitá.*

Shell discoidal, spire small, whorls (4) flattened, the last whorl carinated and angulated; angles (9) costated; costæ elevated; there are also encircling lines decussated by others which are longitudinal, and a small, closely nodulated carina, surrounding the upper portion of the whorls, near to the suture; the first two volutions are smooth, rounded, elevated, but minute.

*Locality.* This species occurs in the vicinity of Minchinhampton more frequently than any other of the genus, but, owing to its thinness and delicacy, few examples are well preserved. The white stone of Bussage is the most favorable position for obtaining it.

Great Oolite, Eparcy, France (*D'Archiac.*).

SOLARIUM VARICOSUM. Plate IX, figs. 23, 23a, b.

*S. Testá conico-depressá; anfractibus (1) angulatis, lineis crebris transversis et longi-*



*tudinalibus decussantibus et varicibus irregularibus angulatis, ornatis; umbilico contracto, basi latá, tenuissimè cancellato.*

Shell conical, depressed; whorls (4) angulated, and encircled with closely-arranged lines, longitudinally crossed by others, and equally densely arranged; varices elevated, longitudinal, angulated in their middle part, and placed at irregular distances; the umbilicus is contracted; the base is wide, slightly convex, and has a finely-cancellated surface.

*Locality.* It occurs in the planking of Minchinhampton Common, very rarely.

SOLARIUM DISCULUM. Plate IX, figs. 25, 25a, b.

*S. Testá parvá, supernè discoideá, infernè concavá, lateribus angustatis, planis; spirá vix elatá; anfractibus 3, marginibus angulatis et nodulosis, nodulis crebris, depressis; umbilico magno, margine noduloso.*

Shell small, discoidal above, concave beneath, the sides narrow and flattened; the spire, scarcely elevated, consists of 3 whorls, their margins angulated and nodulated, the nodules closely arranged and depressed; the umbilicus is large and deep, its margin is nodulated; the flattened sides of the last whorl are finely striated transversely.

The extreme flatness of the upper surface, the generally depressed form, and angular outer margin, distinguish it from contemporaneous species.

*Locality.* It is rare, and occurs in the planking at Minchinhampton, and in the white stone of Bussage and Eastcombs.

#### DELPHINULA, *Lam.*

Shell turbinated, thick, rugose; whorls few, convex or angular; aperture orbicular, entire; peritreme continuous, thickened; umbilicus conspicuous and denticulated.

DELPHINULA CORONATA, *Sow. sp.* Plate IX, fig. 26.

EUOMPHALUS CORONATUS, *Sow.* 1824. Min. Con., t. 450, fig. 3.

— — *Brown.* Illust. Foss. Conch., p. 82, t. 43, figs. 20—22.

DELPHINULA CORONATA, *Flem.* 1827. Brit. Anim., p. 312.

— — *Bronn.* 1848. Index Palæont., p. 406.

? DELPHINULA STELLATA, *Buvignier.* Mém. Soc. Philom. Verdun, 2. pl. 5. figs. 35, 36.

SOLARIUM CORONATUM, *D'Orb.* Prod. Paléont., p. 300.

*D. Testá discoideá, parvá, supernè planá, angulatá et spinigerá; spinis latis, acutis et prominentibus; basi concavá.*

Shell discoidal above, flattened, angular, and spined; spines broad, pointed, placed at the angle of the last volution; base concave.

*Locality.* This little species is very rare. It occurs in the planking of Minchinhampton Common.

The specimen figured in the 'Min. Con.' is from the Oolite of Ancliff, Wiltshire; M. Buvignier describes his species as occurring in the Coral Rag of St. Mihiel, France.

DELPHINULA BUCKMANNI. Plate V, fig. 8.

*D. Testá turbinatá, spirá elatá, anfractibus (3—4) costatis; ultimo anfractu ventricosó, subquadrato, in medio costato; costis longitudinalibus, numerosis, rectis, et rotundatis, superne acutis, striis transversis impressis; umbilico contracto, striis tenuissimis cincto.*

Shell turbinated, spire elevated, whorls (3—4) costated, the last whorl ventricose, subquadrate, costated in its middle portion; the costæ are longitudinal, numerous, perpendicular, acute at their upper extremities, and impressed with transverse striæ; the umbilicus is contracted, and encircled with very fine striæ.

The costæ are scarcely visible upon the upper surface of the last whorl, and nearly disappear towards its base; the aperture is suborbicular, the lips being less incrassated than is sometimes seen in this genus. Individual specimens vary very much in the elevation of the spire, and in the degree of squareness or angularity which the last whorl acquires; in some the umbilicus is scarcely visible, which usually happens in the more elevated shells.

*Locality.* This shell occurs in the beds of coarse planking on Minchinhampton Common; but well-preserved examples are rare.

DELPHINULA ALTA. Plate IX, fig. 31.

*D. Testá turbinatá; spirá elatá, obtusá; anfractibus angulatis (internè rotundatis); anfractu ultimo tuberculis acutis, crebris sed distinctis ornato; basi quadricinctá, costulis tuberculatis; umbilico magno profundo; aperturá subquadratá.*

Shell turbinated; spire elevated, obtuse; whorls angular (the moulds of the interior being convex); the last whorl has, surrounding its upper part, a circle of elevated, acute, distinct, and closely-arranged tubercles; the base is encircled with four elevated ribs, which are closely tuberculated; the upper or flatter part of the last whorl has several fine encircling lines (often indistinct); the umbilicus is large and deep, the aperture subquadrate and rather small.

*Locality.* Minchinhampton. This pretty shell occurs in the planking, and is not uncommon; but the coarseness of the deposit is unfavorable to the preservation of its more delicate features. Our best specimens may therefore be regarded as some of the choicer productions of the formation.

*Sub-genus, CROSSOSTOMA.*

*C. Testá crassá, turbinatá, lævi, subdepressá; anfractibus subplanis, paucis; apice obtuso; aperturá subrotundá, integrá; columellá dentem obtusam formante; labio externo lævi, umbilico nullo. In ætate seneci aperturá contractá crassá, orbiculari, laminá testaceá flabelliformi cinctá.*

Shell thick, turbinated, smooth, somewhat depressed or Rotelliform; whorls more or less flattened, few; apex of the spire obtuse, depressed; aperture nearly circular, entire; the columella forms at its base a simple prominent obtuse tooth; the outer lip is smooth; there is no umbilicus. In the oldest state of growth, the aperture becomes contracted by the deposition of shelly matter; it is perfectly orbicular, the circumference very thick, and is encircled with a thin frilled appendage, always irregular, and more or less produced.

In this genus the aperture undergoes a remarkable change as it approaches the last state of growth. The surface is very smooth, the figure Rotelliform, and the aperture is that of a smooth depressed *Monodonta*; and this is the usual condition in which the several species occur. Finally, however, a few thick lines of growth closely follow each other; the columella is concealed by a deposition of shelly matter; the aperture becomes precisely that of a *Delphinula*, and is surrounded by an additional shelly irregular lamina, which projects from it in every direction.<sup>1</sup>

## CROSSOSTOMA PRATTII. Plate XI, figs. 21, 21a.

*C. Testá parvá discoideá lævi; spirá subplaná, vix elatá; lineis incrementi rugis propè aperturam sitis; aperturá parvá, orbiculatá, labris incrassatis, laminá testaceá abnorme cincto.*

Shell small, discoidal; spire nearly flat, or but slightly elevated; the last volution has some rugose lines of growth situated near to the aperture; aperture small, orbicular; the lips incrassated, and encircled with an irregular shelly lamina.

The shelly encircling lamina is produced by an irregular expansion of the ultimate fold of growth; the few rugose plicæ have the more remarkable aspect, as the whole of the shell, excepting within the brief space of two lines from the aperture, is perfectly smooth.

*Locality.* Inferior Oolite near Bath.

We are indebted to S. P. Pratt, Esq., F.R.S., for the original specimens obtained from that locality.

<sup>1</sup> M. A. D'Orbigny has described a species belonging to this sub-genus, under the name *Delphinula reflexilabrum*, from the Lias of Fontaine-Etoupefour: "Shell smooth, resembling a *Turbo*, but having a reflected, sharp, lamellar peristome surrounding the mouth."—*Prod. Paléont.*, p. 229.



## CROSSOSTOMA? DISCOIDEUM. Plate XI, figs. 7, 7a, 7b.

*C. Testá lævi, depressá; spirá prominulá; anfractibus angustatis, suturis impressis; aperturá parvâ, suborbiculari.*

Shell smooth, depressed; spire but little elevated, or nearly flat; whorls narrow, the sutures distinct; aperture small, basal nearly round. The height is equal to half the basal diameter.

This is, probably, only a variety of *C. Prattii*, and in a state in which all our Great Oolite specimens occur—the outer lip not being quite entire, and extremely thin and slightly rugged, never perfecting a well-defined lip (*C. discoideum*); the change to the ultimate condition occupies a space which does not exceed one fourth of a revolution, a few rugged lines of growth are formed; an irregular lamina next protrudes, forming a kind of frill around a contracted, thickened, and orbicular aperture, as in *C. Prattii*.

*Locality.* Minchinhampton Common and Bussage, at which places it occurs somewhat rarely, and in more than one of the shelly beds.

## CROSSOSTOMA? HELICIFORME. Plate XI, fig. 8.

*C. Testá lævi, turbinatâ, subdepressâ; spirâ parvâ prominulâ; anfractibus convexiusculis; aperturâ ellipticâ.*

Shell smooth, turbinated, somewhat depressed; spire small, but little elevated; whorls rather convex; aperture elliptical.

*Locality.* It is somewhat rare; our specimens have been obtained from the planking of Minchinhampton Common; it is likewise found in the middle division of the Inferior Oolite at Leckhampton, near Cheltenham.

This species has the general form of *C. discoideum*, but the spire is more elevated; they are only provisionally referred to *Crossostoma*, having somewhat the aspect of *Mondonta*, and even (in *C. discoideum*), the thickened base of *Rotella*.

## PHASIANELLA, Lam. 1812.

Shell oval, smooth; aperture oval, entire, forming an acute angle posteriorly at the junction of the columella and outer lip; outer lip thin; inner lip spread over a portion of the columella.

The Great Oolite shells provisionally referred to this genus are small, and like their recent congeners, individuals of the same species offer a considerable variety of form, which makes their determination rather difficult.

PHASIANELLA ELEGANS. Plate XI, figs. 27, 27a.

*P. Testá ovato-elongatá; anfractibus (7) convexiusculis; spirá acutá, aperturá longiore.*

Shell ovately elongated, whorls (7) convex, the spire acute, larger than the aperture.

The height of the last volution is rather more than the remainder of the spire; the whorls are narrow and convex; the sutures strongly impressed. Axis 16 lines, transverse diameter 8 lines.

*Locality.* The planking of Minchinhampton Common has supplied this species in considerable numbers.

PHASIANELLA LEYMERIEI, *Archiac.* Plate XI, figs. 31, 31a, 32.

PHASIANELLA LEYMERIEI, *Archiac.* 1843. Mém. Soc. Géol. Fr., tom. v, t. 28, fig. 12.

— — *D'Orb.* 1850. Prod. Paléont., p. 301.

— — *Bronn.* Index Palæont., p. 956.

*P. Testá ovatá, sub-globosá; spirá parvâ; anfractibus (6) angustis, convexiusculis, anfractu ultimo amplo; aperturá obliquâ magnâ.*

Shell ovate, subglobose; spire small; whorls (6) narrow, convex; the last whorl large; aperture oblique and large.

The length of the aperture is greater than that of the remainder of the spire, and the length of the last volution is twice as great as the spire. The variety of figure in this species is more than usually considerable. Axis 12 lines, transverse diameter 8 lines.

*Locality.* It is the most common of the Great Oolite *Phasianellæ*, and occurs in all the shelly beds near Minchinhampton.

PHASIANELLA CONICA. Plate XI, figs. 30, 30a.

*P. Testá ovato-conicâ, acutâ; spirâ mediocriter elatâ, conicâ; anfractibus (6) planis, ultimo elongato; aperturâ obliquâ angustâ.*

Shell ovately conical, acute; spire moderately elevated, conical; whorls (6) flattened; the last whorl elongated; aperture oblique and narrow.

This species is somewhat spindle-shaped, narrowing at both ends; the length of the aperture is less than that of the spire; but the last two volutions occupy more than two thirds of the entire length of the shell. Axis 10 lines, transverse diameter 4 lines.

*Locality.* It is not uncommon, and occurs in all the shelly beds, more especially at Minchinhampton Common.

**PHASIANELLA ACUTIUSCULA.** Plate XI, figs. 28, 28a.

*P. Testá ovato-conicá; spirá elatá, acutá; anfractibus planis, angustis; anfractu ultimo ovato, magnitudine modico.*

Shell ovately conical; spire elevated, acute; whorls flattened, narrow; the last whorl ovate, its size moderate.

The figure most nearly approaches to *P. conica*, but it is less gibbose; the spire is more acute, elevated; the whorls less numerous and narrow.

*Locality.* It is not uncommon, and is found in all the shelly beds near to Minchinhampton.

**PHASIANELLA NUCIFORMIS.** Plate XI, fig. 26.

*P. Testá ovato-elongatá; spirá parvá; anfractibus (6) subplanis, ultimo elongato; aperturá angustatá.*

Shell ovately elongated; spire small; whorls (6) flattened, the last elongated; aperture narrow.

The length of the aperture is equal to that of the spire; the spire is acute; the volutions very narrow, except the last two turns, which are much elongated. Axis 9 lines, transverse diameter 5 lines.

*Locality.* It occurs in the planking of Minchinhampton Common, but is rare.

**PHASIANELLA PARVULA.** Plate XI, figs. 29, 29a.

*P. Testá parvá; spirá elatá, apice acuto; anfractibus (6—7) planis aut subconvexis, angustis; anfractu ultimo subgloboso; aperturá obliquá; columellá arcuatá.*

Shell small; spire elevated; apex acute; whorls (6—7) flattened, or rather slightly convex and narrow; the last whorl globose and large; the aperture oblique and oval; the columella curved at its base.

The length of the aperture is two fifths of the entire shell; the whorls are more numerous, and the apex more acute, than is found in the other Great Oolite species; the aperture is rather small and contracted at its base. Axis 5 lines, transverse diameter  $2\frac{1}{2}$  lines. Rare.

*Locality.* Minchinhampton Common.



PHASIANELLA TUMIDULA. Plate XI, figs. 25, 25a.

*P. Testá turbinatá, elongatá; spirá acutá; anfractibus convexis (8), suturis depressis; anfractu ultimo globoso; aperturá magná ovato-rotundatá.*

Shell turbinated, elongated; spire acute; whorls (8) convex, the sutures deeply depressed; the last whorl globose; the aperture large, ovately rounded.

This species has an elevated, acute spire, and convex whorls, and is remarkable for the sudden increase of the last two volutions, which are very ventricose. Neither of our specimens are quite perfect about the outer lip; but the distinctive character of the species is sufficiently evident. Axis 19 lines, transverse diameter 11 lines.

*Locality.* It occurs rarely in the planking at Minchinhampton Common.

*Family*—PLEUROTOMARIDÆ.

PLEUROTOMARIA, DeFrance. 1825.

SCISSURELLA, D'Orbigny. 1823.

Shell turbinated or conical; aperture subquadrate, the angles rounded; outer lip thin and sharp, having a fissure or deep notch in the middle part, or near to the suture; an encircling band or rib round each whorl follows the fissure.

The *Pleurotomariæ* are rare in the Minchinhampton beds, and the larger specimens are usually broken. It will be observed, in the following descriptions, how very few examples of each species have been obtained, so that we are almost enabled to give their number with exactness. Placed amidst such a multitude and variety of molluscous relics, in spots teeming with life, it is not easy to account for their rarity and imperfect condition. Inferring that they were usually gregarious, we are led to suspect that the *littoral* condition of these shelly beds was not suited to their propagation, and that the larger imperfect specimens were denizens of greater depths, the shells occasionally being stranded among the more littoral Mollusks. As a remarkable instance of the recurrence of similar phenomena at a very distant locality, we would direct attention to the elaborate and valuable Memoir of M. Deslongchamps,<sup>1</sup> on the *Pleurotomariæ* of the secondary formations of Calvados, in which 53 species are mentioned as occurring in the Lias and the Lower and Middle Oolitic systems. It is stated that they are exceedingly abundant; but, on referring to the Great Oolite species, 11 in number, we find, with one exception only, a repetition of the following remarks appended to them: "One example; two examples; rare; very rare." In fact, when describing the species which we have identified in that Memoir, we seem, when stating their numbers, to be repeating the words of its author.

<sup>1</sup> Mém. Soc. Linn. de Normandie, vol. viii.

PLEUROTOMARIA SCALARIS, *Desl.* Plate X, fig. 14.

PLEUROTOMARIA SCALARIS, *Deslongchamps*. 1848. Mém. Soc. Linn. de Normandie, vol. viii, p. 67, pl. 8, fig. 1.

*Var. a*, TURGIDULA, *Desl.*, *ibid.*, p. 67.

— SCALARIS, *D'Orb.* 1850. Prod. Paléont., p. 269.

*P. Testá crassá, trochiformi; spirá plus minusve exsertá; apice acuto; anfractibus carinatis, subgradatis aut gradatis, transversè striatis, sinu magno profundo; fasciá sinús prominente, lavi aut longitrorsum densissimè striatá, in medio anfractuum sitá; ultimo anfractu ad basim angulato, obtusiusculo; basi planá aut subconvexá; umbilico aut parvo, aut minimo, aut nullo; aperturá subquadratá, labro sinistro crassiori reflexo.* (*Deslongchamps.*)

Shell thick, trochiform; spire more or less elevated; apex acute; whorls carinated, more or less step-like, transversely striated; sinus large and deep; band of the sinus prominent, smooth, or very finely striated longitudinally, and placed in the middle of the whorl; the last whorl is angulated, or somewhat obtuse at the lower margin; the base is flat, or slightly convex; the umbilicus small, very minute, or wanting altogether; the aperture subquadrate, the left lip being thick and turned outwards.

Altogether we have obtained eight or nine specimens. They vary in the elevation of the spire, and agree with the first variety of *P. scalaris* of M. Deslongchamps, viz. the *turgidula* which he thus characterises:

“*Testá conicá, anfractibus subrotundato angulatis, vix gradatis, transversim obsoletissimè striatis, striis in ultimo basis vicinis; basi subconvexá, striis radiatis incrementi tantum notatá, umbilico minimo.*”

Axis 29 lines, basal diameter 26 lines.

*Locality.* The planking of Minchinhampton Common has furnished all our specimens, only three of which are well preserved. Inferior Oolite, Bayeux. (*Desl.*)

PLEUROTOMARIA PAGODUS. Plate X, fig. 9. Var. DEPAUPERATA.

? PLEUROTOMARIA PAGODUS, *Deslongchamps*. 1848. Mém. Soc. Linn. de Normandie, vol. viii, pl. 14, fig. 4.

— — *D'Orb.* 1850. Prod. Paléont., p. 301.

*P. Testá trochiformi, subturritá; apice acutiori; anfractibus gradatis, infra fasciam constrictis, transversim et tenuissimè striatis, in medio nodis coronatis ad suturam subundulatis; sinu magno, profundo; fasciá sinús planá, densissimè longitrorsum striatá, infra*

*nodos sitá; ultimo anfractu ad basim angulato subnodoso; basi subconcahá, concentricè striatá, striis tenuibus, profundis ad umbilicum minimum nullis; aperturá subpentagoná.*

Shell trochiform, subturreted; apex rather acute; whorls step-like, narrowed beneath the band, transversely and finely striated, coronated in the middle by a circle of nodules, subundulated even to the suture; the sinus is large and deep, the band of the sinus is flat, densely striated longitudinally, and situated beneath the nodules; the last whorl is angulated at lower margin and slightly nodulated; the base is somewhat concave, concentrically and very delicately striated; the umbilicus is very small or obsolete; the aperture is nearly pentagonal.

*Locality.* Two specimens only have been found in the Minchinhampton district. Both are small compared with the fine specimen figured by M. Deslongchamps, who is very fortunate in that respect, considering that the species is likewise very rare in Normandy. Its position is the soft shelly Oolite beneath the planking at Minchinhampton Common.

#### PLEUROTOMARIA DISCOIDEA. Plate X, fig. 12.

*P. Testá turbinato-depressá, spirá obtusá, anfractibus subconvexis, lævibus et angustatis; sinu angustissimo; fasciá sinus strictá, et planatá interdum vix notatá, infrá mediam anfractuum sitá; ultimo anfractu ad basim angulato convexo, basi subconvexá, lævi; umbilico minuto aut nullo, aperturá subquadratá.*

Shell turbinated, depressed: spire obtuse; whorls somewhat convex, smooth, and narrow; sinus very narrow; the band of the sinus narrow, flattened, and smooth, sometimes scarcely distinguishable, and placed beneath the middle of the whorls; the last whorl is angulated, and convex at the margin; the base is slightly convex, and smooth; the umbilicus minute or wanting; the aperture subquadrate.

The small elevation of the spire, which is only equal to two fifths of the basal diameter, necessarily renders the whorls narrow; the basal angle of the last whorl is unusually acute; the sutures of the whorls are strongly marked.

Though possessing few distinctive characters, it is little liable to be confounded with others; the extreme smoothness, depressed form, and proximity of the sinus and fascia to the base of the whorls, are obvious and sufficient features. Height 4 lines, basal diameter 10 lines.

*Locality.* We can enumerate seven specimens; they occurred in the white stone at Bussage; also in the lower portion of the formation on the south side of Minchinhampton Common, where the rock is not very shelly.



PLEUROTOMARIA OBESA, *Desl.* Plate X, fig. 11.

PLEUROTOMARIA OBESA, *Deslongchamps*. 1848. Mém. Soc. Linn. de Normandie.  
vol. viii, p. 134, pl. 14, fig. 1.  
— — *D'Orb.* 1850. Prod. Paléont., p. 302.

*P. Testá trochiformi, apice subacuto, anfractibus rotundatis, in medio subdepressis, transversè striatis; striis frequentibus obsoletis, æqualibus, sinu angustissimo, profundissimo, fasciâ sinûs strictissimâ, vix a striis distinctâ, longitrorsum tamen densissimè striatâ, in medio anfractuum sitâ, ultimo anfractu ad basim angulato-convexo; basi subconvexâ concentricè striatâ, striis rarioribus obsoletissimis, hinc et inde evanescentibus, umbilico magno, pervio (parietibus subplanis), ad marginem sulcato, sulco sat parvo, spiraliter ascendente, suturæ internæ vicino, sed ab ea distinctissimo; aperturâ subquadratâ.* (*Deslongchamps*.)

Shell trochiform, apex subacute; whorls somewhat convex, slightly depressed in their middle, and transversely striated; the striae, which are equal, are frequently obsolete; the sinus is narrow and deep, the band very narrow, so as scarcely to be distinguished from the striae; but it is densely striated longitudinally, and situated in the middle of the whorls; the last whorl is convexly angulated at the lower margin; the base is somewhat convex, concentrically striated, the striae being frequently scarcely distinguishable; the umbilicus is large, pervious (the sides nearly flat), sulcated at its margin, and ascends the interior spirally, near to the internal sutures, but distinct from them; the aperture is subquadrate.

*Locality.* We have only procured two specimens, which do not fully exhibit the minute features of this species, so carefully described by M. Deslongchamps. Both were obtained from the planking of Minchinhampton Common. Great Oolite, Ranville. (*Desl.*)

PLEUROTOMARIA CLATHRATA, *Goldf.* Plate X, figs. 6, 6a.

? PLEUROTOMARIA CLATHRATA, *Goldfuss*. 1843. Petref. p. 74, t. 186, fig. 8.  
— — *D'Orb.* 1850. Prod. Paléont., p. 356.

*P. Testá trochiformi subdepressâ, apice acuto, anfractibus planis, (5,) cingillis lineisque crebris clathratis; basi convexo-planâ tenuissimè clathrata; umbilico minimo aut nullo; anfractibus supernè obsoletè tuberculatis; fasciâ sinûs marginali.*

Shell trochiform, somewhat depressed; apex acute; whorls (5) flattened, their sutures well marked; covered with very fine, regular, equal lines, both longitudinal and transverse; the base is flattened or slightly convex, with a very fine cancellated surface; umbilicus

minute or obsolete; the upper border of the whorls has an obscure encircling row of tubercles; fascia of the sinus marginal; the aperture quadrate.

The delicate markings upon the surface are only visible under a magnifier. The general figure and character of the surface nearly approximates to *Pleurotomaria punctulata*, Deslongchamps, but in that species the fascia of the sinus is placed upon the middle of the whorls, and it is destitute of the upper encircling band of tubercles.

Axis 4 lines, basal diameter 6 lines.

*Locality.* The white stone of Bussage has furnished our specimen, but the species is very rare.

PLEUROTOMARIA COMPOSITA. Plate X, figs. 13, 13a.

*P. Testá turbinatá, conicá; spirá subacutá; anfractibus supernè convexis, infra planatis vel subconcavis; sinu magno; fasciá sinús latá, longitudinaliter striatá, in medio anfractuum sitá; anfractibus supra fasciam densissimè longitudinaliter et obliquè striatis; striis inæqualibus; infra fasciam striis transversis æqualibus profundis subdistantibus; anfractu ultimo ad basim rotundato; facie infimá planá, vel subconvexá, longitudinaliter tenuissimè et inæqualiter undulatim striatá; umbilico nullo? vel minima; aperturá subpentagonali.*

Shell turreted, conical; spire subacute; whorls convex in their upper portions, flattened or slightly concave in their lower; the sinus large, the band of the sinus wide, longitudinally striated, and situated in the middle of the whorls; the whorls above the band are, longitudinally, densely and obliquely striated; the striæ are unequal; beneath the band the whorls are transversely striated; the striæ are equal, deeply impressed, and rather distant; the last whorl is rounded at the lower margin; the base is flat or slightly convex, it is longitudinally, densely, and unequally striated; the striæ undulate; umbilicus none or minute; aperture subpentagonal. Axis 9 lines, basal diameter 11 lines.

*Locality.* The lower weatherstone beds at Quarrhouse and Minchinhampton have yielded several specimens.

TROCHOTOMA, *Lycett. Deslongchamps, 1842.*

RIMULUS, *D'Orb. 1839.*

DITREMARIA, *D'Orb. 1842.*

*T. Testá turbinatá, conicá; anfractibus sæpissimè angulatis, in medio vittá strictá notatis; periphæriá subangulatá; aperturá subquadratá; columellá arcuatá; basi excavatá,*

*infundibuliformi, umbilicum simulante; fissurá elongatá, anticè clausá, non longius ab ore, ultimum anfractum subdepressum perforante.* (Deslongchamps.)

Shell turbinated, conical; whorls usually angulated, having a band or rib encircling the middle of each whorl; periphery subangular; aperture basal, subquadrate; columella curved; base excavated, excavation large, and resembling an umbilicus; fissure transversely elongated, closed anteriorly, but not far from the outer lip, its length being about equal to the distance which separates it.

Our specimens exemplify the changes which the shell underwent during its advance of growth. The perfect aperture, and likewise certain oblique furrows, to be seen upon other parts of the shell, indicate so many stages of repose, each of which probably continued a considerable period; the amount of advance at each stage varied from one half to three fourths of a volution.

During the period of repose, the egress currents probably passed through the fissure; the edges of which are worthy of notice. The substance of the shell generally is thick, but the edges of the fissure are extremely thin, and exhibit that irregular, ragged, or imperfect outline which is seen in bone or shell during the process of growth or absorption. When, however, the animal was forming new shell in advance of the aperture, the fissure was not advanced forward with it, but the anal siphon remained in the same position until a considerable progress had been made in the formation of new shell. At length that organ was withdrawn, to be protruded from the aperture, and the formation of a new fissure immediately commenced. One specimen in our possession exhibits the fissure still open, although the formation of new shell had proceeded beyond the old aperture to the extent of one fourth of a volution. In this condition the outer lip is ragged and imperfect; and during the brief period of the formation of a new fissure, the aperture acquires exactly the aspect of a *Pleurotomaria*; and it is not uncommon to find specimens in this condition. The new shell is then very thin, and consequently is more or less crushed or imperfect. These several removals of the anal siphon, and formation of new fissures at distant intervals, are analogous to what is observed in *Haliotis*, except that in the latter genus several perforations remain open during the formation of a new one, and their borders are regular and smooth, not being destined to undergo the change which we observe in *Trochotoma*. It seems indeed not improbable, that in the young state, or until three volutions had been completed, that no fissure was formed, and that the siphon was protruded from the aperture. This idea is founded upon the fact that those volutions are always smooth, convex, and destitute of the encircling rib which subsequently follows the fissure. This character is best seen by contrast in such species as in advanced growth become very angular or step-like, as in *T. tabulata*, *T. discoidea*, and *T. extensa*. The reader is referred to the interesting observations on this genus, by M. E. Deslongchamps, 'Mém. Soc. Lin. Normandie,' vol. vii, pp. 99—104.



TROCHOTOMA ACUMINATA, *Desl.* Plate X, figs. 18a, 20.

TROCHOTOMA ACUMINATA, *Deslongchamps*. 1842. *Mém. Soc. Linn. de Normandie*,  
tom. vii, p. 108, pl. 8, figs. 11—15.

DITREMARIA ACUMINATA, *D'Orb.* 1850, *Prod. Paléont.*, p. 301.

*T. Testá conicá, spirá plus minusve elatá, lævi aut substriatá; apice acuminato; anfractibus (7, 8) ex apice ad aperturam magis á magis tumescentibus donec ultimus subquadratus fiat; infimá facie dilatató, in medio cavum infundibuliformem ferente, ad periphæriam concentricè striatá.* (*Deslongchamps*.)

Shell conical, spire more or less elevated, smooth, or slightly striated; apex acute; whorls (7, 8) gradually increasing from the apex until the last whorl becomes subquadrate; the lower surface has a very deep but somewhat contracted cavity, which is concentrically striated.

This is the most elevated or conical of the Great Oolite species. The last volution is distinctly striated, the rib posterior to the aperture being very prominent; the height and basal diameter are about equal.

*Locality.* Great Oolite of Minchinhampton and Bussage; Langrune, France.

TROCHOTOMA CONULOIDES, *Desl.* Plate X, fig. 16.

TROCHOTOMA CONULOIDES, *Deslongchamps*. 1842. *Mém. Soc. Linn. de Normandie*,  
tom. vii, p. 109, pl. 8, figs. 16—19.

DITREMARIA — *D'Orb.* *Prod. Paléont.*, p. 301.

*T. Testá conicá, apice acuto; anfractibus (5, 6) concentricè striatis, planis; ultimo anfractu viâ ad fissuram dilatato; basi ad periphæriam convexiusculá, striatá, in medio profundè excavatá.*

Shell regularly conical, apex acute; whorls (5, 6) concentrically striated, flattened; the lower surface convex, striated, and deeply excavated.

The volutions are narrow and flattened, the encircling rib narrow and elevated; the figure is very oblique, the basal diameter exceeds the height by one fourth.

Our figure is somewhat reduced.

*Locality.* Great Oolite of Minchinhampton and Bussage; Luc, Langrune, France.

## TROCHOTOMA TABULATA. Plate X, figs. 17, 17a.

*T. Testá conicá, apice acuto, anfractibus (5) tenuissimè striatis subquadratis, medio angulatis; anfractu ultimo subangulato; basi planato, profundè excavatá.*

Shell conical, apex acute; whorls 5, very finely striated, step-like, and angulated in their middle portion; the last whorl is angulated, the base flattened and deeply excavated.

The sides of the volutions are nearly flat, both above and beneath the angle, which, together with the smallness of the encircling rib, fineness of the striae, and acute apex, serves to distinguish it from *T. calia* or *T. affinis*, Desl., which is an Inferior Oolite species. It is moderately common. Height 10 lines, basal diameter 12 lines.

Our figure is of medium dimensions.

*Locality.* Great Oolite of Minchinhampton.

## TROCHOTOMA OBTUSA. Plate X, fig. 15a, b.

*T. Testá turbinatá; apice obtuso; anfractibus (5) convexiusculis, striatis, basi dilatátá, medio latè excavatá; periphæriá striatá.*

Shell turbinated; apex obtuse; whorls (5) rather convex, striated, the lower surface dilated, its middle widely excavated, periphery striated.

The encircling rib is large but depressed, and contributes to give a convex aspect to the whorls; the striae are large, the general figure being more turbinated, or less regularly conical than is usual with the *Trochotomæ*, each advance of growth was equal to two thirds of a volution: it is by far the most abundant of the genus. Height 10 lines, basal diameter 13 lines.

*Locality.* Great Oolite of Minchinhampton.

## TROCHOTOMA EXTENSA. Plate X, figs. 19a, 19b.

*T. Testá conicá; apice obtuso, depressá; anfractibus (4, 5) subangulatis, planis, et lævibus; basi amplá, profundè excavatá.*

Shell conical; apex obtuse, depressed; whorls (4, 5) subangular, flattened, and smooth; base wide, rather convex; cavity large and deep.

This is by far the largest and most rare of the Great Oolite species, the base is enormously wide, and the cavity very large. Height 16 lines, basal diameter 30 lines.

*Locality.* Minchinhampton.

TROCHOTOMA DISCOIDEA, *Roëmer*, sp. Plate X, figs. 10, 10a, 10b, 10c.

?TROCHUS DISCOIDEUS, *Roëmer*. 1836. Nordd. Oolith., p. 150, t. 11, fig. 12.

— — *D'Orb.* 1850. Prod. Paléont., p. 354.

— — *Bronn.* 1848. Index Palæont., p. 1300.

*T. Testá discoideá, plano-convexá, basi concavá, lato-umbilicatá; anfractibus (3) depressis, subconvexis, transversim lineatis, basi acutis; aperturá transversè depressá, ovatá.* (*Roëmer*.)

Shell discoidal, slightly convex, base concave, widely umbilicated; whorls (3) depressed, rather convex, transversely lineated, lines impressed by closely-arranged longitudinal and very fine oblique striæ; lines upon the base acute; aperture depressed and excavated.

We have never been able to discover an open fissure upon this small species, but the general figure agrees with this genus so well that we have not ventured to assign it to any other. Four lines are visible upon the lower and seven upon the upper face of the last volution, which is angular or step-like; the first two turns are smooth and rounded: rare. Height 3 lines, basal diameter  $7\frac{1}{2}$  lines.

*Locality.* Minchinhampton; Coral Rag, near Hildesheim (*Roëmer*).

STOMATIA, *Lam.* 1801.

STOMAX, *Montfort.* 1810.

Shell suborbicular or oblong, generally ear-shaped and depressed; in most species the spire is prominent, but not produced, nor elongated; sometimes, however, it is very small, marginal, and inconspicuous. Aperture mostly longitudinal; in some species nearly orbicular; in others much elongated; always very large; its edges entire, united, at the upper part, and scarcely modified or altered in form by any portion of the last volution. Volutions from two to four. (*G. B. Sowerby*.)

From the characters of the aperture and the presence of the carina, we have ventured to assign the following shell to the genus *Stomatia* (*Lam*), from most of the recent species of which it differs in having a depressed spire, and the lines of growth and spiral striæ very regular, and sharply defined. Should other specimens afford further generic distinctions, we would suggest the name *Megastoma* for it.



STOMATIA? (MEGASTOMA), *Buvignieri*. Plate IX, fig. 32, 32 a.

*S. Testá semiglobosá; spirá parvá, depressá; anfractu ultimo transversim costulato, et in medio carinato, cariná acutá, elatá, costis longitudinalibus densis, lineis tenuissimis impressis notatis; aperturá magná semilunari; labio externo fisso?*

Shell semiglobose; spire depressed; last whorl with a mesial, elevated, acute carina, crossed by longitudinal, narrow, elevated ribs—the ribs being impressed by fine encircling, transverse lines; aperture very large; outer lip slightly notched. The shell above the carina is flattened; the ribs, which are perfectly regular, pass over the carina, and beneath are decussated by fine transverse lines.

*Locality.* This rare shell, which attains the size of a small bean, has only been found in the soft oolite beneath the planking on Minchinhampton Common.

We have dedicated this species to M. Buvignier, who has figured and described some apparently congeneric forms under the name of *Stomatella carinata* and *S. funata*. (See ‘Mém. Soc. Phil. Verdun,’ 1843, p. 19, t. 5, f. 27—30.)

*Family*—FISSURELLIDÆ.

FISSURELLA, *Lam.* 1801.

FISSURELLUS, *Montfort*, 1810.

Shell conical, base entirely open, orbicular or oval; apex central or subcentral, having a foramen of an oval figure, central, or near to the anterior or shorter side; surface usually cancellated, or ornamented with ribs and lines; margin generally thickened; muscular impression nearly continuous.

FISSURELLA ACUTA, *Desl.* Plate VIII, fig. 5, 5a—c.

FISSURELLA ACUTA, *Deslongchamps*, 1842. Mém. Soc. Linn. de Normandie, tom. vii, pl. 7, figs. 22—24.

RIMULA — *D'Orb.* 1850. Prod. Paléont., p. 303.

*F. Testá conicá, altá; basi subcirculari; apice acuto, subcentrali; foramine subapicali, anticè versato, superne rotundato, inferne rimá angustá producto, striis longitudinalibus parvis crebris, aliis transversis testam decussantibus.* (*Deslong.*)

Shell conical, elevated, nearly circular; apex acute, nearly central; foramen a little anterior to the apex, rounded above, narrow below; striæ longitudinal, small, closely-arranged, crossed by others, transverse and less prominent. Height 3 lines, base 3 lines.

*Locality.* This little conical shell ranks with the rarest productions of the Great Oolite; the white stone of Eastcombs and Bussage have furnished the only known English specimens: Langrune, France.

RIMULA, *Defrance*, 1827.

RIMULARIA, *Defrance*. 1827.

SIPHO, *Brown*. 1847.

Shell conical, base entirely open, oval; apex curved more or less posteriorly; surface near the anterior border with a fissure, or oval foramen, usually placed upon a prominent longitudinal rib; the fissure does not reach the margin.

RIMULA TRICARINATA, *Sow.*, sp. Plate VIII, fig. 2, 2a—c.

EMARGINULA TRICARINATA, *Sow.* 1826. Min. Con., t. 519, fig. 2.

— — *Brown*. 1847. Illust. Foss. Conch., p. 104, t. xlviii, figs. 14, 14\*.

— — *Bronn*. 1848. Index Palæont., p. 457.

— — *D'Orb.* 1850. Prod. Paléont., p. 303.

*R. Testá parvá, conicá; apice posticè curvato, costis tribus magnis anticis, aliis minoribus posticis, lineis interstitialibus, transversis numerosis.*

Shell small, conical; apex curved posteriorly, with three large diverging, anterior ribs; other smaller ribs occupy the sides and posterior part of the shell; the interstitial spaces have numerous tranverse lines.

In this species, as in the *R. Blotii*, the fissure is of a lengthened oval figure, and is cut out of the middle and more elevated rib. Having examined the original specimen figured in the Mineral Conchology, we are enabled to assign it to the present genus without hesitation; in two of the specimens on the same tablet, an imperfection at the anterior extremity of the mesial rib gave them somewhat the aspect of an *Emarginula*, and may have been the reason, probably, for assigning both this and *R. clathrata* with that genus.

*Locality.* Ancliff: two specimens have, likewise, been found at Minchinhampton.

RIMULA CLATHRATA, *Sow.*, sp. Plate VIII, fig. 1, 1a—c.

EMARGINULA CLATHRATA, *Sow.* 1826. Min. Con., t. 519, fig. 1.

? — GOLDFUSSII, *Roëmer*. 1836. Nordd. Oolith., t. 19, fig. 23.

? — — *Goldfuss*. 1845. Petref., t. 167, fig. 15.

SIPHO CLATHRATA, *Brown*. 1847. Illust. Foss. Conch., p. 103, t. 48, figs. 1, 2.

RIMULA — *Morris*. 1843. Catalogue of British Fossils, p. 160.

— — *Bronn*. 1848. Index Palæont., p. 1088.

— — *D'Orb.* 1849. Prod. Paléont., p. 303.

*R. Testá conicá; apice posticè curvato; ambitu ovali; rimá angustá, costis majoribus radiantibus (circa 18), minoribus transversis decussatis.*

Shell conical; apex somewhat spiral, and curved posteriorly; base oval, foramen narrow, lengthened, and rather distant from the anterior margin; ribs radiating (about 18 in number), crossed by others, smaller and transverse.

The indifferent condition of the original specimen will account for its having been placed with *Emarginula*.

*Locality.* Ancliff and Minchinhampton; at the latter place it occurs only in the bed of planking: it is rare.

RIMULA BLOTII, *Desl.*, sp., Plate VIII, fig. 3, 3*a*, *b*, *c*.

EMARGINULA BLOTII, *Deslongchamps*. 1842. *Mém. Soc. Linn. de Normandie*, tom. vii, pl. 10, figs. 1—3.

— — *D'Orb.* 1850. *Prod. Paléont.*, p. 303.

*R. Testá parvá, crassá, conicá; apice posticè curvato, lateribus subplanis; costis radiantibus magnis 15 et parvis 14 alternis; sulcis punctis transversalibus magnis notatis.*

Shell small, thick, conical; apex curved posteriorly, the sides flattened; ribs radiating, 15 larger and 14 smaller, alternating—the three larger anterior ones being the most prominent; the transverse sulci of the interstitial spaces are large.

This species bears a considerable resemblance to *R. tricarinata*; but it is more compressed laterally, the three large anterior costæ are less divergent, and the form of the base is a longer oval. The *R. tricarinata* is likewise destitute of the smaller ribs, and has more numerous transverse lines.

*Locality.* It occurs rarely at Ancliff; and is likewise scarce in the shelly roestone of the Inferior Oolite at Leckhampton Hill, Cheltenham. A single specimen, badly preserved, has also been procured at Minchinhampton. Colleville, Calvados.

EMARGINULA, *Lam.*, 1801.

PATELLA sp., *Linn.*

EMARGINULUS, *Montf.* 1810.

Shell conical; apex usually curved posteriorly, base entirely open, orbicular or oval; its anterior margin having a vertical fissure more or less lengthened; surface ornamented with ribs, and decussated.



EMARGINULA SCALARIS, *Sow.* Plate VIII, figs. 4, 4a, b, c.

EMARGINULA SCALARIS, *Sow.* 1826. *Min. Con.*, t. 519, figs. 3, 4.

— — *Brown.* 1847. *Illust. Foss. Conch.*, p. 103, t. xlviii, fig. 5.

— — *Bronn.* 1848. *Index Palæont.*, p. 456.

— — *D'Orb.* 1850. *Prod. Paléont.*, p. 303.

? — — *Desl.* 1842. *Mém. Soc. Lin. Norm.* vii. p. 125.

*E. Testá parvá, conicá; ambitu suborbiculari; apice plus minusve postico; costis lævibus radiantibus et transversis decussantibus; rimá elongatá latá.*

Shell small, conical; base nearly circular; apex elevated, more or less posterior; ribs radiating, smooth, transversely crossed by others. The radiating ribs are narrow, but are somewhat larger than those which are transverse; the mesial radiating rib bifurcates near the margin, forming a lengthened and wide fissure.

*Locality.* Ancliff and Minchinhampton; at the latter place it is very rare: Langrune, France.

#### Family—PATELLIDÆ.

PATELLA, *Linnaeus.* 1758.

PATELLARIA, *Lhwyl.* *Lith. Brit. Ich.*

HELCION, *D'Orbigny.*

Shell ovately conical, with an oblong or oval base; apex subcentral, or inclining towards the anterior side; internal surface smooth; muscular impression horse-shoe shaped; margin of the aperture entire.

PATELLA CINGULATA, *Goldf.* Plate XII, figs. 4, 4a—d.

PATELLA CINGULATA, *Goldfuss.* 1843. *Petref.*, t. 177, fig. 11.

HELCION — *D'Orb.* 1850. *Prod. Paléont.*, p. 358.

*P. Testá conicá, ambitu ovali, verticè subacuto, elato, erecto, antemediano; striis concentricis confertis irregularibus.*

Shell conical, base oval, apex subacute, elevated, erect, placed anterior to the middle line of the shell, with encircling, irregular, closely-arranged striæ.

This may be regarded as one of the most abundant and characteristic of the *Patellæ* of the Great Oolite. It occurs in all the shelly beds, but more especially in the white stone of Eastcombs and Bussage, near Brimscombe. The dimensions vary from the size of a duck-shot to a diameter of seven lines; and, from the great thickness of the shell, it is usually well preserved. The height is equal to two thirds of the longer basal diameter.

PATELLA RUGOSA, *Sow.* Plate XII, figs. 1, 1a—g.

PATELLARIA SIMA, *Lhwyd.* 1760. Lith. Brit. Ich., t. 8, No. 436.<sup>1</sup>

THE PATELLITE, *Park.* 1811. Org. Rem., vol. iii, p. 50, t. 5, fig. 21.

PATELLA RUGOSA, *Sow.* 1816. Min. Con., t. 139, fig. 6.

— — *Fleming.* 1827. Brit. Anim., p. 288.

— — *Brown.* 1849. Illust. Foss. Conch., p. 104, t. xlviii, fig. 18.

— — *Morris.* 1843. Cat. Brit. Foss., p. 155.

— ANCYLOIDES, *Sow.* 1824. Min. Con., t. 484, fig. 2.

— — *Brown.* Illust. Foss. Conch., p. 105, t. xlviii, figs. 27—29.

? — TESSONII, *Deslongchamps.* Mém. Soc. Linn. de Normandie, vol. vii, t. 7, fig. 3.

HELICION RUGOSA, *D'Orb.* Prod. Paléont., p. 303.

*P. Testá ovalá, posticè convexá, anticè subconcvá, apice depresso, versùs marginem anticum inflexo; costulis radiantibus crebris, interstitiis lineatis; striis alteris transversis decussantibus, anticè congestis, testamque corrugantibus, posticè remotis.*

Shell ovate, posterior side convex, anterior rather concave; apex depressed, inclined towards the anterior margin; the longitudinal radiating ribs are closely arranged, with fine lines between them, and decussated by encircling striæ, which, upon the anterior side, are corrugated or compressed closely together; posteriorly they are remote.

The aspect of this shell varies considerably, even in specimens obtained from the same quarry; and these differences are irrespective of those produced by the various stages of growth. Some approach to the circular form, and in such the apex is more central, elevated, and less curved forwards; others, which are a longer oval, have the summit more beak-like and depressed. The different degrees of magnitude in the radiating costæ, and the depth to which they are impressed by the encircling striæ, likewise contribute to the varieties of aspect. The greater number of specimens obtained from the quarries at Minchinhampton Common have a rugose aspect, but those from the quarries situated to the north of the vale of Brimscombe are usually different; the shell becomes very thin, the form is more depressed, and the surface is nearly smooth, the ribs being faintly marked, and the encircling striæ scarcely discernible. When very young, and not exceeding 6 lines in length, the figure is more depressed, of a longer oval, nearly smooth, and the apex is turned, and even slightly twisted to the right side, constituting the *Patella ancylroides* of the 'Mineral Conchology.' It is rare to obtain the shell so small; and the Ancliff specimen, upon which the species was founded, is, in common with all the Great Oolite shells of that locality, extremely small, but the number of intermediate sizes obtained, leave no doubt of its identity. It occurs, indifferently, in all the shelly beds. Our largest specimen has a length of  $2\frac{1}{2}$  inches, a width of  $2\frac{1}{4}$  inches, and a height of 13 lines.

*Locality.* Minchinhampton Common; Bussage; Ancliff.

Found also in the Stonesfield slate (*Sowerby*); in the roestone of the Inferior Oolite at

<sup>1</sup> "Patellaria sima, fusci coloris, cancellata major. E lapicidinâ Stunfeldiensi," p. 24.

Leckhampton Hill, near Cheltenham (*Buckman*); and in the Great Oolite of Langrune, Luc, Ranville, &c., Normandy (*Deslongchamps*).

The *Patella Tessonii* (E. Desl.), which is referred to this species with some doubt, was obtained from the Inferior Oolite of Moutiers-en-Cinglais by M. Tesson.

PATELLA PARADOXA. Plate XII, figs. 2, 2a, b.

*P. Testá suborbiculatá, apice depresso, versùs marginem anticum inflexo, latere antico concavo, postico convexo; costis radiantibus, clatis, rotundatis, undulatis, transversim striatis, et distantibus, costis posticis 9 magnis, lateralibus obscuris, anticis congestis et corrugatis.*

Shell suborbicular, apex depressed, turned towards the anterior margin; anterior side concave, posterior convex; ribs radiating, large, distant, elevated, rounded, undulated and impressed by transverse striæ; the posterior costæ, about 9 in number, are large, those upon the sides of the shell are depressed and obscure; the anterior ribs are congested and corrugated.

The general aspect of this singular shell reminds us of *Patella rugosa*, which it follows somewhat in its varieties of aspect. When young, the few posterior costæ are prominent, but the sides of the shell are smooth, and the general figure is more depressed and elongated; the costæ are much larger than in *P. rugosa*, more distant, and, in consequence, much fewer; and the entire shell has a wrinkled and very rugose aspect. The colours are usually more or less preserved.

*Locality.* This may be considered as the most rare of the Minchinhampton *Patellæ*. The few examples obtained have been found in the planking, or in the equivalent white stone of Eastcombs and Bussage. The young form, were it known only by a single specimen, would probably be regarded as a distinct species; the older specimens attain nearly the dimensions of a middle-sized *P. rugosa*.

PATELLA SULCATA, *Deslongchamps*. Plate XII, figs. 3, 3a, b.

PATELLA SULCATA, *Deslongchamps*. 1842. Mém. Soc. Linn. de Normandie, vol. vii, p. 115, t. 7, figs. 9—11.

HELICION — *D'Orb.* 1850. Prod. Paléont., p. 272.

*P. Testá subellipticá, conico-depressá; apice recto; costis clatioribus radiantibus, inæqualibus, squammato-rugosis, sulcis profundis interpositis, margine subcrenato.*

Shell subelliptical, conical, but depressed; apex erect; ribs elevated, radiating, unequal, squamose or rugose, with deep interstitial spaces; margin somewhat crenated.

The costæ do not increase in size materially as they approach the margin, and the additional ribs which are added with increase of growth equal the others in size. This



species possesses a general resemblance to *P. Aubentonensis*, but the ribs are much more elevated, closely arranged, and rugose. The figure given by M. Deslongchamps is more elevated, but possesses no other essential distinctive character. Length 9 lines, breadth 7 lines, height 3 lines.

*Locality.* Rare, in the planking of Minchinhampton Common; also found in the Inferior Oolite of Port-en-Bessin (*Deslongchamps*).

**PATELLA STRIATULA.** Plate XII, figs. 5, 5*a*, *b*.

*P. Testá parvá, conicá, obtusá; ambitu ovali; costis radiantibus, tenuioribus, crebris, flexuosis et nodulosis; lineis incrementi irregularibus.*

Shell small, conical; apex obtuse; base oval; with ribs radiating, fine, closely arranged, waved, and nodulated; lines of growth irregular.

This species is more elevated than *P. Aubentonensis*, and the apex more obtuse; the costæ are likewise finer and more closely arranged.

*Locality.* In the soft shelly Oolite beneath the planking at Minchinhampton, where it is rare.

**PATELLA ROEMERI.** Plate XII, figs. 6, 6*a*, *b*.

*P. Testá ellipticá, depressá; apice subcentrali; costis (30) radiantibus elatis; lineis interstitialibus numerosis; striis transversis impressis; lineis incrementi irregularibus paucis.*

Shell depressed, elliptical; apex subcentral, with 30 radiating and elevated ribs; interstitial lines numerous, the whole being crossed and impressed by striae; lines of growth irregular and few.

This elegant little species is sometimes nearly discoidal, the central portion being most frequently denuded of costæ; the form is more nearly circular than *P. Aubentonensis*, and more depressed; the costæ are more elevated and less rounded, the interstitial spaces being much deeper. The longer diameter rarely exceeds 9 lines, the elevation being about 2.

*Locality.* It is moderately rare, but not confined to any one shelly bed, in the vicinity of Minchinhampton.

**PATELLA AUBENTONENSIS, Archiac.** Plate XII, figs. 7, 7*a*, *b*, *c*, *d*.

PATELLA AUBENTONENSIS, *Archiac.* 1843. Mém. Soc. Géol. de France, vol. v, p. 377, t. 28, fig. 8.

HELICION — *D'Orb.* 1850. Prod. Paleont., p. 304.

*P. Testá conicá, depressá; ambitu ovali; apice acuto, antemediano; costulis radiantibus inæqualibus irregularibus, flexuosis; striis transversis tenuissimis, irregularibus.*

Shell conical, depressed; base oval; apex acute, placed anterior to the middle of the shell; ribs radiating, unequal, irregular and waved; striæ transverse, irregular, and very fine.

The radiating ribs are sometimes only visible towards the margin; the lines of growth are few and uncertain; as in the other *Patellæ*, the degree of elevation varies considerably, the apex approaching more nearly to the anterior border in such as are depressed; the colours are sometimes partially preserved.

*Locality.* It is not uncommon, and occurs in all the shelly beds of the Great Oolite near Minchinhampton. Our largest specimen is  $1\frac{1}{2}$  inches in its longer diameter.

M. D'Archiac describes this species as occurring in the Great Oolite of Aubenton, France, where it is rare.

*PATELLA SUPRAJURENSIS, Buv.* Plate XII, figs. 9, 9a.

? *PATELLA SUPRAJURENSIS, Buvignier.* 1843. Mém. Soc. Philom. de Verdun (Meuse), pl. 5, fig. 10.

*P. Testá ovato-depressá; apice subcentrali; ambitu ovali; striis incrementi irregularibus, distinctis; striis concentricis tenuissimis crebris.*

Shell ovate, depressed; apex subcentral; base oval; lines of growth irregular, strongly marked; concentric striæ closely arranged and very fine.

The absence of radiating costæ sufficiently separates this from *P. Aubentonensis*, the general figure of which it nearly resembles; the lines of growth are likewise much more strongly marked.

*Locality.* It is comparatively rare, and is not confined to any of the shelly beds of the Oolite at Minchinhampton. Found also in the Portland limestone of Varennes. (*Buv.*)

*PATELLA ARACHINOIDEA.* Plate XII, figs. 8, 8a, b.

*P. Testá parvâ, ellipticâ et conicâ; apice acuto centrali; costulis longitudinalibus minutis et distantibus; lineis transversis numerosis, elatis et irregularibus.*

Shell small, elliptical and conical; apex acute, central; with longitudinal, minute, and distant ribs; transverse lines very numerous, elevated, and irregular.

This small species has an elevated, acute apex, and displays under the magnifier a beautiful net-work kind of surface; the encircling lines are three or four times more dense than the longitudinal elevations. The form is nearly that of *Pileolus plicatus*, but more acute, and the character of the surface is altogether different.

*Locality.* The shelly beds at Quarhouse, which correspond to the planking of Minchinhampton Common, have furnished our specimens.

PATELLA INORNATA. Plate XII, figs. 11, 11a.

*P. Testá elliptica, lævissimá, lateribus subcompressis; apice elato, erecto, subacuto, et postmediano; latere antico concavo, postico recto.*

Shell elliptical, very smooth, the sides rather compressed; the apex erect, elevated; subacute, and situated posterior to the middle of the shell; anterior side concave, posterior straight.

The figure is a lengthened oval, the anterior side being rather depressed and produced; the concavity anterior to the apex, presents some resemblance to *P. nitida* (Deslongchamps); but in that shell the anterior side is much the shortest. *P. nitida* is, likewise, much more nearly orbicular and conical, the vertex being distinctly curved forwards. The smaller specimens have a more depressed figure, the anterior cavity being scarcely perceptible.

Longer diameter 10 lines, shorter diameter 8 lines, height 5 lines.

*Locality.* It occurs in all the shelly beds, but is not very common in the Minchinhampton district.

PATELLA NANA, Sow. Plate XII, figs. 10, 10a.

PATELLA NANA, Sow. 1824. Min. Con., t. 484, fig. 3.

— — Fleming. 1827. Brit. Anim., p. 288.

— — Morris. 1843. Cat. Brit. Foss., p. 155.

— — Brown. 1849. Illust. Foss. Conch., p. 105, t. xlviii, figs. 24—26.

HELICION NANA, D'Orb. 1850. Prod. Paléont., p. 303.

*P. Testá parvá, ellipticá, conicá, lævissimá; apice submediano, erecto, obtuso.*

Shell small, elliptical, conical, very smooth; apex nearly mesial, erect and obtuse.

The figure approaches near to *P. cingulata*, but it is usually a longer oval, and slightly compressed at the sides; in the young state the apex is more obtuse and depressed, the form being then a longer oval. Many of the larger specimens are scarcely to be distinguished from *P. cingulata*, except by the absence of encircling striæ; and in badly preserved specimens the striæ are nearly obsolete. *P. nana* may, therefore, possibly be only a variety of *P. cingulata*; they occur in the same beds, and are equally numerous. It is true that good specimens of each species are sufficiently distinct; but knowing the variations to which the shells of this genus are subject, we have thought proper to allude to the possible specific affinity. The size never equals that of the larger specimens of *P. cingulata*.

*Locality.* Minchinhampton Common: found also in the Oolite of Ancliff, near Bradford, Wilts.



DESLONGCHAMPSIA, *M'Coy*,<sup>1</sup> 1849.

*D. Testá orbiculatá, conicá; apice subcentrali versus marginem anticum inflexo; costulis radiantibus, antico sulco lato longitudinali, in laminam appendiculatam producto.*

Shell suborbicular, conical; apex acute, subcentral, curving slightly forwards; with a wide longitudinal anterior sulcus, produced into a rounded lobe.

This genus has been separated from the *Metoptoma* of Phillips, on account of the prolongation of the anterior excavated side into a rounded process, which it is presumed does not exist in that genus; the surface is highly ornamented, but the *Metoptomæ* are smooth. Two species are known, one of which is the *Patella appendiculata* of M. Deslongchamps (Mém. Soc. Linn. de Norm. vii, pl. XI, f. 1, 2); a somewhat oval shell, having simple, large radiating costæ, and the present species which has a cancellated surface. M. Deslongchamps remarks, that in all the patelloid shells, except the *Patellæ*, the apex is turned posteriorly, and if there exists any notch, furrow, or peculiar mark, it is always found on the anterior side, and never on the side to which the apex is curved. The situation of the furrow anteriorly, in the *P. appendiculata*, or on that side to which the apex of the shell is turned, as in the *Patellæ*, would indicate an important modification in the mantle, or some other organ of this mollusc.<sup>2</sup>

DESLONGCHAMPSIA EUGENEI, *M'Coy*. Plate XII, figs. 13, 13a.

*D. Testá suborbiculatá, conicá; apice subcentrali, acuto, sulco antico lato striato; costulis numerosis, longitudinalibus, transversisque decussantibus; sulcis interstitialibus profundis.*

Shell suborbicular, conical; apex subcentral, acute, anterior sulcus wide, striated; ribs

<sup>1</sup> Professor M'Coy having kindly forwarded his notes on this genus, intended for publication, we have, with his permission, inserted them:

“DESLONGCHAMPSIA, *M'Coy*.

“Shell convex, radiatingly ridged; apex eccentric towards the anterior end; a concave spoon-shaped hollow extends from the apex, gradually inclining to the outer margin, which it carries downwards into a small rounded lobe.

“This shell, like Phillips's genus *Metoptoma*, has a triangular hollow extending from the apex to the front margin, therein differing from *Patella*; the present genus differs from *Metoptoma* in its ridged surface, and from it and *Patella* in the front margin being produced downwards into a rounded lobe. This latter structure would prevent the firm adhesion of the shell! This group has been recognised by M. E. Deslongchamps, but not characterised, as he only knew one species. Having obtained another, perfectly distinct, but identical in generic characters, I have characterised the genus, and dedicated it to M. Deslongchamps, to whom I think the merit of recognising it in the first instance belongs. Any one who reads the charming passage in M. Deslongchamps' Memoir (p. 119, vol. vii of the 'Mém. de la Soc. Linn. de Normandie') will understand the pleasure with which I dedicate this species to his son Eugene, under the name of *Deslongchampsia Eugenei*.”—(*M'Coy's MS. notes*, 1849.)

<sup>2</sup> In the specimen in the British Museum, (figured Plate XII, fig. 13,) the apex is imperfect, but the direction of the striae appear to indicate a reverse or posterior direction of the apex, and, consequently, analogous to the *Fissurellidæ*.

elevated, numerous, transversely crossed by others of nearly equal size; and interstitial spaces deep.

The anterior sulcus has a hollowed or spoon-shaped figure, and, like the other portion of the surface, is cancellated; but the longitudinal ribs are more closely arranged: the number of ribs in the circumference is about 50.

Height 3 lines, basal diameter 6 lines, width of anterior sulcus at the margin 2 lines.

*Locality.* It is very rare, and has been obtained only in the white stone of Eastcombs and Bussage: we are not aware that more than three examples have been found.

UMBRELLA? HAMPTONENSIS. Plate XII, figs. 12, 12a.

*U. Testâ parvâ, depressâ; ambitu orbiculari; apice obtuso, depresso, centrali; costis radiantibus, lævibus, paucis, irregularibus, flexuosis; sulcis interstitialibus separatis.*

Shell small, depressed; base orbicular; apex obtuse, discoidal, and central; ribs radiating, smooth, few, irregular, and waved; separated by interstitial sulcations.

This little shell is sometimes perfectly flat, but usually somewhat convex; it is extremely thin, and as the under surface has not been fully disclosed, it must be referred to *Umbrella* with some degree of doubt; it may, however, be probably considered as related to the patelliform shells. The basal diameter rarely exceeds 4 lines.

*Locality.* The soft shelly Oolite beneath the planking usually furnishes it in the neighbourhood of Minchinhampton: it is rare.

## ORDER—OPISTHOBRANCHIATA, *M. Edwards.*

### *Family*—BULLIDÆ.

#### BULLA, *Linn.*

Shell oval, ventricose, or cylindrical, generally thin and fragile, the last whorl more or less enveloping the preceding ones; spire umbilicated, or slightly produced; aperture large, the whole length of the shell, narrow above and dilated below; outer lip sharp.

The specimens of this genus from the Great Oolite are very few, and in a condition less satisfactory than could be wished. They have been obtained (with a single exception) from the upper beds of the formation to the east of the town of Minchinhampton. These beds usually consist of hard gray or brownish calcareo-siliceous sandstones, sometimes concretionary, and contain *Ceromyæ*, certain *Pholadomyæ*, and other shells which are never found in the lower and more shelly beds. The *Bullæ* are rare, but might possibly become less so, were the stone brought more under the inspection of workmen and connoisseurs; but being lifted only in small quantities during the winter season, from little excavations

for road mending, and being, moreover, a very intractable material, none but a persevering local collector can be expected to obtain even a partial knowledge of its fossil contents. His reward will usually be, as in the present instance, mere imperfect casts, which contrast unfavorably with the products of the richer and softer shelly beds.

*BULLA UNDULATA*, *Bean.* Plate VIII, figs. 8, 8*a*.

*BULLA UNDULATA*, *Bean.* 1839. *Mag. Nat. Hist.*, p. 61, fig. 22.

— — *Morris.* 1843. *Cat. Brit. Foss.*, p. 140.

*B. Testá ovatá, ventricosá; apice umbilicato; umbilico contracto; labro interno sinuato; aperturá magná, supernè angustatá, infernè dilatiorè; striis incrementi numerosis, longitudinaliter undatis.*

Shell ovate, ventricose; apex umbilicated; umbilicus contracted; inner lip sinuated; aperture large; narrow above, wider below; striae of growth numerous, longitudinally undulated.

Breadth, two thirds of the length.

The specimen figured by Mr. Bean in the 'Magazine of Natural History,' from the Cornbrash of Yorkshire, is about half as large again as the shell here described, and the inner lip is not so much sinuated; but in other respects it is very similar.

The general features of this shell bear a considerable resemblance to the *Bulla elongata*, Phillips, 'Geology of Yorkshire,' pl. iv, fig. 7; but it is much less elongated than that species.

*Locality.* Our specimen was obtained from the upper portion of the Great Oolite formation, in a bed of hard brown shelly sandstone, 95 feet above the Fullers-Earth, one mile and a half east of Minchinhampton. Rare.

*BULLA LOLIOLUM.* Plate VIII, figs. 16, 16*a*, 16*b*.

*B. Testá cylindro-ventricosá; aperturá angustá, basi subdilatatá, vertice subcontracto, profundè excavato, margine elato, et rotundato.*

Shell cylindrical, but ventricose; aperture narrow, its base rather dilated, apical cavity somewhat contracted and deeply excavated; the mamillary apex of the whorls being large, and rising considerably from the base of the cavity, but not so high as the outer margin; margin of the cavity elevated, narrow, and rounded.

The figure is nearly barrel-shaped, both the extremities appearing truncated and narrower than in the middle part. The character of the apical cavity resembles that of several species of *Cylindrites*, figured upon the same plate; we have not been able to expose the base of the columella; but, judging from the general figure of the shell and of the



aperture, we prefer to regard it as a *Bulla*. Upon comparing approximate forms it will be found that the figure of the base and cavity of the vertex is much wider than in *C. pyriformis*; the cavity is much more contracted and deeply excavated than in *C. bullatus*; a third shell, which more nearly approximates in form to our species, is the *Bulla Hildesiensis*, figured by Roëmer, (Verst. Nord. Ool. Geberges, t. ix, fig. 26,) in which, however, the form appears to be more elongated and the aperture more expanded towards the base.

Our shell would seem to be rare; we have obtained it in one small excavation only, about 100 feet above the Fullers-Earth, in concretionary sandstone: the disintegrating action of frost has enabled us to detach two specimens, and we have vainly endeavoured to extricate several others from a matrix harder than themselves.

Axis 7 lines, transverse diameter  $5\frac{1}{2}$  lines, diameter of the cavity 2 lines.

*Locality.* A superficial excavation one mile east of Minchinhampton.

*Family*—ACTÆONIDÆ.

CYLINDRITES—*Nov. gen.*

ACTÆON sp., Sow., D'Orb.

*Testá subcylindricá vel ovatá, spirá parvá; anfractibus plerumque planis, marginibus acutis, anfractu ultimo cylindraceo, aperturá elongatá, supernè linearis, infernè integrá et rotundatá; columellá ad basim cortortá, labro dextro tenui ad basim crassiori.*

Shell smooth, subcylindrical or ovate; spire small; whorls usually flattened, with acute margins; the last whorl cylindrical; aperture lengthened; linear above; rounded and entire at the base; columella rounded, twisted near to the base, and slightly directed outwards; right lip thin, but thicker at the base.

The cylindrical figure, flattened and nearly concealed volutions, their acute margins, the linear aperture and columella directed outwards at the base, are the characters which entitle this group to be separated from Actæon (*Tornatella* Lam.), and constituted a new genus, it is in fact a *Pyramidella* in all but the basal notch; some of the species will be found to approach to the Cones, others the *Bullæ*, in each case more nearly than to Actæon. Species of this genus also occur in the Inferior Oolite, but they are perfectly distinct from those which are here described.

All the species of this genus have smooth shells; in Actæon most of the species are transversely striated or punctato-striate.

Mr. Sowerby, in the description of *Actæon cuspidatus*, remarks, "So novel is the contour of this little shell, that it is with difficulty compared to any before known; it agrees, however, with the essential characters of Actæon, but differs in general form, and

in having a plain surface ; it comes nearer in shape to *Volvaria*, but that has a truncated or notched base, and crenated lip to the aperture, besides several plaits upon the columella."

It has been proposed to form a new genus of it, to be called *Cylindrites*, but the following species (*A. acutus*) having a conical spire, connects it with *Actæon Noæ*. 'Min. Con.' 5, p. 77, 1825.

Notwithstanding their general resemblance to *Actæon*, we believe the species here described to be generically distinct from the typical forms of that genus, and have therefore proposed to retain the name *Cylindrites* for them.

The genus may be divided into two sections :

*A.* Species with the spire elevated and acute.

*B.* Species with the spire depressed and mammillated.

The species belonging to the second section appears to pass into the *Acteonellæ* of the cretaceous system.

*A.* Species with the spire elevated and acute.

*CYLINDRITES ACUTUS.* *Sow.* sp. Pl. VIII, fig. 9, 9 *a*, *b*.

*ACTÆON ACUTUS*, *Sow.* 1824. Min. Con., t. 455, fig. 2.

— — *Morris.* 1843. Cat. Brit. Foss., p. 138.

— — *D'Orb.* 1850. Prod. Paléont., p. 299.

— — *Bronn.* 1848. Index Palæont., p. 10.

*Testá subcylindricá, spirá conicá, apice acuto, anfractibus (4) planis seu subconvexis; anfractu ultimo margine rotundato.*

Shell subcylindrical, spire conical, apex acute ; whorls (4) flat or slightly convex ; the last volution rounded at its upper margin.

*Locality.* This shell occurs in much greater numbers than all the individuals of the other species put together ; it may, in fact, be considered as one of the most common univalves in the Great Oolite near Minchinhampton.

It occurs in the Oolite at Ancliffe, Wiltshire, whence the original specimens were obtained, which are figured and described in the 'Mineral Conchology,' and Mr. J. de C. Sowerby has kindly allowed us the use of the same for examination and comparison.

*CYLINDRITES CUSPIDATUS.* *Sow.* sp. Pl. VIII, fig. 10, 10 *a*.

*ACTÆON CUSPIDATUS*, *Sow.* 1824. Min. Con., t. 455, fig. 1.

— — *Morris.* 1843. Cat. Brit. Foss., p. 138.

— — *D'Orb.* 1850. Prod. Paléont., p. 299.

— — *Bronn.* 1848. Index Palæont., p. 10.

*TORNATELLA CUSPIDATA*, *Deslongchamps.* Mém. Soc. Linn. de Normandie, vol. vii, p. 136, t. x, figs. 25, 26.

— — *Brown.* Illust. Foss. Conch., p. 85, t. xliii, figs. 11, 12.

*Testá cylindricá, spirá parvá sub-inversá, apice mammillato; anfractibus angustis planis; anfractu ultimo margine rotundato.*

Shell cylindrical; spire small, somewhat inversed in the latter volutions; apex mammillated; volutions narrow, flattened; the last one rounded at the upper margin.

The upper margin of the last whorl rises as high as the one or two preceding ones, leaving their edges exposed so that the small mammillated apex and one or two first whorls seem to rise from a cavity. In the character of its spire this shell forms a passage to the remaining species, in none of which does the apex of the spire rise higher than the margin of the last whorl, the vertex is consequently more or less bowl-shaped or concave, the volutions never being entirely concealed, but exhibiting their upper edges.

This is a rare shell, and, with the preceding species, is found indifferently in all the beds of shelly oolite belonging to this Formation.

*Locality.* Minchinhampton Common; Ancliff, Wiltshire; Langrune, France.

#### CYLINDRITES ANGULATUS. Pl. VIII, fig. 11, 11 *a, b*.

*Testá cylindricá; spirá mediocriter elatá, sub-concavá; apice acuto; anfractibus (8) angustis supernè angulatis.*

Shell cylindrical; spire moderately elevated, with rather concave sides, and an acute apex; volutions eight, narrow and angular in their upper part.

The general figure of this shell is somewhat shorter than *C. acutus*, the volutions are very narrow and angular, which, together with the somewhat concave spire, give it a well-marked form; it is more common than the last species.

*Locality.* The upper beds of the Great Oolite near Minchinhampton.

#### CYLINDRITES ALTUS. Plate VIII, figs. 12, 12 *a, b*.

*C. Testá cylindricá, subfusiformi, spirá elatá; anfractibus (8) planis latis.*

A cylindrical, subfusiform shell, with an elevated spire, and eight flattened, and rather broad, volutions.

In this species the spire is flattened with an acute apex, which is equal in length to a third portion of the entire shell.

*Locality.* Minchinhampton Common. It is moderately rare.



*B. Species with the spire depressed and mammillated.**A. CYLINDRICI.*

CYLINDRITES CYLINDRICUS. Plate VIII, figs. 19, 19*a*, *b*, *c*.

*C. Testá cylindricá, elongatá, truncatá; spirá depressá, vel obsoletá, vertice subconcavo; anfractibus angulatis, anfractu ultimo margine superiore acuto.*

Shell cylindrical, lengthened, truncated; spire depressed, almost obsolete; vertex rather concave; volutions angular, the last one with the upper margin acute.

This is the most elongated and truncated species of the group, and might easily be mistaken for a specimen with an imperfect spire: in well-preserved specimens the apex may be observed to consist of two volutions, which rise above the others, forming a mammillated summit; the base of the shell is much contracted and lengthened.

*Locality.* It is rare, and has been found only in the "planking" of Minchinhampton Common.

CYLINDRITES EXCAVATUS. Plate VIII, figs. 17, 17*a*, *b*.

*C. Testá cylindricá, truncatá; spirá inversá, apice mammillato, vertice magno profundè excavato; anfractibus numerosis, marginibus acutis notatis; anfractu ultimo subconvexo, margine superiore acuto, subcontracto; ceteræ notæ desunt.*

Shell cylindrical, truncated; spire inverted; apex mammillated, vertex large, deeply excavated; whorls numerous, their upper margins acute; the last whorl somewhat convex, with an acute margin, and slightly curving inwards. Base not seen.

The specimen being rather imperfect at the base prevents our ascertaining with exactness the length of the species, which would appear to be intermediate to *C. bullatus* and *C. Thorentei*, but is certainly less elongated than the latter species; the vertex is large and very deeply crateriform, the apex not rising much above the centre of the deep concavity, and not so high as the margin of the last volution, the edges of the numerous whorls being visible in the concavity.

*Locality.* This example and a section of another are all which have been obtained; they occurred in the upper series of the Great Oolite formation, a little higher than the hard cream-coloured limestone, and in a rock of nearly equal compactness, two miles east of Minchinhampton, on the road to Cirencester; the same rock, also, contains *C. acutus* and *C. angulatus*, but the intractable nature of the material renders it extremely difficult to obtain good specimens.

CYLINDRITES BREVIS. Plate VIII, figs. 13, 13a, b.

*C. Testá parvá, cylindro-truncatá, apice amplo, plano, margine acuto; lateribus planis; aperturá ad basin sub-expanso.*

Shell small, truncated, cylindrical, vertex large, flattened, its margin acute; sides of the shell flattened, marked with lines of growth; aperture moderately expanded towards the base.

This is the most truncated species of the genus in the Great Oolite. The vertex is very wide, almost perfectly flattened; but the acute edges of the volutions are visible, and likewise the minute mamillary apex. These characters, together with the short figure, serve to distinguish it from *C. cylindricus*, Plate VIII, fig. 19, the shell which most nearly approaches to it. Axis 5 lines, diameter of vertex 3 lines.

*Locality.* Minchinhampton Common, where it is very rare.

CYLINDRITES THORENTI, *Buvign.*, sp. Plate VIII, figs. 22, 22a, b, c.

BULLA THORENTEA, *Buvignier*. 1842. Géol. des Ardennes, p. 535, t. v, fig. 9.

— — *Buvignier*. 1843. Mém. Soc. Philom. Verd., ii, t. 5, fig. 11.

— — *D'Orb.* 1850. Prod. Paléont., p. 304.

— ELONGATA, *Thorent*. Mém. de la Soc. Géol. de France, iii, p. 258. (Not Phillips, Geol. of Yorkshire.)

*C. Testá subcylindricá, lateribus convexiusculis, spirá parvá, depressá, contractá; anfractuum marginibus solùm exsertis; aperturá angustá, columellá ad basin uniplicatá.*

Shell subcylindrical, the sides somewhat convex, smooth, or slightly marked by the lines of growth; spire small, depressed, and contracted; the whorls with their margins only visible; aperture narrow, basal fold of the columella large.

The apical excavation is more contracted than in either of the other species; the apex is large, but does not rise quite so high as the outer margin; the shell, in its general figure, is elongated and contracted at both the extremities. Axis 9 lines, greatest transverse diameter 4 lines, diameter of the terminal excavation 1 line.

*Locality.* Minchinhampton Common; it occurs in the bed of planking, but is very rare.

M. A. Buvignier states that this fossil is found in the white limestone of the Great Oolite in the environs of Rumigny. M. Thorent has also found it near Aubenton, and mentions it in the Memoir above referred to, under the name of *Bulla elongata*, as occurring in the Coral Rag; this is considered to be an error by M. Buvignier, as the bed containing it, in following its course into the Ardennes, is undoubtedly beneath the Oxford Clay.

## B. PYRIFORMI.

CYLINDRITES BULLATUS. Plate VIII, figs. 18, 18*a*, *b*, *c*.

? CONUS? MINIMUS, *Archiac*. 1843. Mém Soc. Géol. de France, tom. v, t. 30, fig. 9.

ACTÆON MINIMUS, *D'Orb.* 1850. Prod. Paléont., p. 299.

ACTÆONELLA MINIMA, *Bronn*. 1848. Index Palæont., p. 13.

*C. Testá subcylindricá, vel ovatá; spirá depressá, inversá; apice mammillato; anfractibus numerosis, marginibus rotundatis; anfractu ultimo, subconvexo, basi contracto.*

Shell subcylindrical, ovate, or bullæform; spire depressed, inversed; apex mammillated; whorls numerous, with rounded margins; the last whorl somewhat convex, with a contracted base.

This form is much shorter than the last, and less flattened; the apex of the spire does not rise higher than the margin of the last whorl; it is mammillated, and consists of three minute volutions; the vertex is moderately large and crateriform. This species is very rare, and has only been observed in the "planking."

*Locality.* Minchinhampton Common. Aubenton, France.

CYLINDRITES PYRIFORMIS. Plate VIII, figs. 20, 20*a*, *b*, *c*; 21.

*C. Testá cylindro-pyriformi, cavá apicali contractá profundá, margine acuto elevato; aperturá ad basim vix dilatatá, plicis magnis.*

Shell cylindrical or pyriform; the apical cavity contracted and deeply excavated, having an acute and somewhat elevated margin; aperture linear; the folds on the columella large.

This shell is more pyriform than its congeners, the anterior extremity being short but attenuated, and the apical cavity deep and contracted. The cast (fig. 21) has not the produced acute margin to the cavity exhibited by the shell (fig. 20), the cavity consequently appears smaller; the apex of the spire is large but deeply situated.

Axis 7 lines, greatest transverse diameter  $4\frac{1}{2}$  lines, diameter of the cavity  $1\frac{1}{2}$  lines.

*Locality.* The planking of Minchinhampton Common. Casts of this shell occur higher in the series in shelly hard sandstone one mile east of Minchinhampton; in both positions it is rare.

ACTÆONINA, *D'Orbigny*, 1850.

COCHLITES CYLINDROIDES, *Luid.* 1760.

ACTÆON, sp., *Phillips*. ACTÆON, sp., *Sow.*

UTRICULUS? *Brown*. 1845. Elements of Fossil Conch.

— *Brown*. 1849. Illustrations of Fossil Conch.



*C. Testá ovato-oblongá; spirá sub-elatá; anfractu ultimo magno, elongato; aperturá longitudinalitèr anfractui ultimo nonnunquam pari, supernè angustatá, infernè latiori; labris continuis, tenuissimis, labio interno non reflecto.*

Shell ovately oblong; spire rather elevated; the last whorl large and elongated; aperture sometimes as long as the last whorl, narrow in its posterior, wider in its anterior part; lips continuous and very thin, the inner lip not reflected upon the columella.

The genus *Utriculus* was established by Capt. Brown, upon the recent *Bulla obtusa*, and was afterwards used to comprise certain species of recent and fossil shells, previously referred by authors to *Bulla*, *Actæon*, &c.<sup>1</sup> Although the general form of the shells thus classed together is somewhat similar, this character cannot always be considered as definite, inasmuch as the animal inhabitant of the fossil species may have materially differed from the recent type. Alc. d'Orbigny, in recognising the generic differences of some allied forms, described as *Tornatella*, subsequently proposed in the 'Prodrome de Paléontologie,' the name *Actæonina* for their reception. The genus *Orthostoma*, instituted by Deshayes, includes an allied series of shells, and connecting them with *Actæon* and *Cylindrites*, if we may judge from the figures given in the 'Traité Elementaire de Conchyliologie,' but of which no description has yet been published. Upon the ground, therefore, of the doubtful generic identity of the recent *Bulla obtusa* with our fossil shells, we have preferred to adopt the name proposed by D'Orbigny.

ACTÆONINA OLIVÆFORMIS, *Dunker*. sp. Plate VIII, fig. 14.

BULLA OLIVÆFORMIS, *Koch and Dunker*. 1837. Nordd. Oolith., t. v, fig. 3.

ACTÆONINA — *D'Orb*. 1850. Prod. Paléont., p. 353.

*A. Testá ovato-cylindraccá, lævi; spirá productiusculá, acutá; anfractibus spirá sub-convexis; aperturá supernè angustatá.*

Shell ovately cylindrical, smooth; spire rather small, or but little produced; whorls rather convex; the upper part of the aperture narrow.

*Locality.* Three examples only, varying much in size, are in our collection. They occurred in the soft shelly stone (termed ovenstone) which overlies the weatherstones at Minchinhampton Common. It is a thinly-laminated deposit, which is sometimes nearly made up of the valves of *Ostrea acuminata*; when these are absent, their place is occupied by a multitude of small bivalves; or, when these again become scarce, other and more interesting forms occur, among which may be ranked the present species.

<sup>1</sup> With regard to the comparative generic differences of the family *Bullidæ*, the reader is referred to an interesting paper by Mr. Clark, published in the 'Annals of Natural History,' for August 1850, from which it appears, by a careful study of the structure of the animals, that the generic subdivisions established by some authors in this group are not well characterised.

ACTÆONINA? PARVULA, *Roemer*, sp. Plate V, figs. 11, 11a, 12.

BUCCINUM PARVULUM, *Roemer*. 1836. Nordd. Oolith., p. 139, t. xi, fig. 23.

ACTÆONINA PARVULA, *D'Orb.* 1850. Prod. Paléont., p. 353.

*A. Testá parvá, orato-conicá; anfractibus (4) subconvexis superioribus, lateribus subplanis; aperturá integrá elongatá, basi angustatá, columellá contortá.*

Shell small, ovately conical; whorls (4) rather convex upon their upper portions, but flattened upon their sides; aperture entire, elongated; base narrow; columella twisted.

This little shell varies much in the length of the spire, specimens with narrow whorls having a greater degree of convexity at their upper part than the others, but in all of them the spire is shorter than the last volution. The largest specimens have an axis of 4 lines, and a transverse diameter of nearly 3 lines.

*Locality.* Minchinhampton. It is found not unfrequently in all the quarries of the district, and is common to the shelly beds.

ACTÆONINA? BULIMOIDES. Plate VIII, fig. 15.

*A. Testá ovato-elongatá, lævi; spirá elatá obtusá; anfractibus (3—4) subconvexis, anfractu ultimo subcylindrico; aperturá ovatá; labro sinistro incrassato.*

Shell ovately elongated, smooth, with an obtuse elevated spire; whorls (3—4) somewhat convex, the last whorl subcylindrical; aperture ovate; inner lip thickened but not broad.

The general figure is pupæform; the aperture in length does not exceed half that of the entire shell.

This species has been provisionally arranged under *Actæonina*, although the great thickness of the shell and expanded columellar lip do not well agree with that genus, and rather approximate it with *Bulimus*. In general form it is very near to the *Chemnitzia Cornelia*, *D'Orb.*, 'Terr. Jurass,' t. 245, figs. 2, 3, from the Coral Rag of France; and both species may hereafter be found to belong to a genus distinct from *Chemnitzia* and *Actæonina*.

*Locality.* Minchinhampton. The specimen figured is the only example which has come to our knowledge. The exact bed from which it was obtained is rather doubtful; but, judging from the matrix to which it is attached, we should infer that its position was probably the upper portion of the Great Oolite.

## ADDENDA.

AMMONITES GRACILIS, *Buckman*. Plate XIII, figs. 2, 2a; and Plate I, fig. 3.

The description of this species is given at page 12, but the additional figure is here given (Plate XIII, fig. 1,) to illustrate the form and general character of the more mature shell, which differs considerably from the young state of it. (Plate I, fig. 3.)

It has the general form of *Am. Charmassei*, D'Orb.; but the costæ in *A. gracilis* are not interrupted over the back as in that species, and the volutions are more fully exposed.

PTEROCERAS WRIGHTII. Plate XIII, fig. 1.

*P. Testâ fusiformi, tumidâ; anfractibus (6) rotundatis, lævibus vel spiraliter striatis; ultimo gibbo, transversim carinato; carinis tribus rotundatis inæqualiter remotis; in digitos longiores productis; dorso ad angulum tuberculis duabus magnis; labro quinque? digito, digitis in ætate adultâ longissimis, flexuosis, recurvatis; caudâ longissimâ arcuatâ.*

Shell fusiform, volutions 6, rounded and smooth, or faintly striated; the body-whorl inflated, and having three indistinct carinæ developed on its upper surface, two of which have a transverse prominent tubercle; each carina leads to a digitate process; labial wing short, and terminating in four long slender flexuous digitations; the first digitation ascends close to the spire, and is attached to it; it curves a little outwards, and then extends backwards an inch and a quarter beyond the apex of the spire, where it is broken off;<sup>1</sup> the second curves gently outwards and backwards; the third is broken off three quarters of an inch from the labial wing; a remaining fragment indicates that it curved gently outwards, and is represented by a dotted line in the figure; the fourth passes forwards for an inch and a half, and then curves outwards; the canal is long, and arched backwards.

This fine fossil presents some points of resemblance to *Strombus Oceani* and *S. Ponti*, Al. Brongniart, but the latter species has upwards of six carinæ upon the last whorl. In size it exceeds all the other Great Oolite examples of the *Strombidae*, and would seem to be very rare. One specimen in the cabinet of the author, which has not the wing developed, and is in other respects imperfect, is the only other known example. The present remarkable shell is in the cabinet of Dr. Wright of Cheltenham, who has kindly communicated it, and to

<sup>1</sup> There are traces of another digitation between the first and second above described, arising near to the base of the former, but apparently broken off in the specimen figured.



whom it is dedicated. The cast of a shell figured by Goldfuss, t. 173, fig. 3, under the name of *Buccinum antiquorum*, from the dolomitic Oolite of Bavaria, may possibly belong to an allied species of the same genus.

*Locality.* Minchinhampton Common, in the beds of planking.

NERITOPSIS VARICOSA. Plate XI, figs. 20, 20*a*; Plate XIII, fig. 5.

*N. Testá neritiformi, ovato-oblongá, varicibus magnis longitudinalibus (circá 10 in ambitu), plus minusce elatis, et lineis numerosis, transversis, regularibus, elatis decussatis; lineis cum striis densissimis perpendicularibus instructis.*

Shell neritiform, ovately oblong; varices large, longitudinal (about 10 in a volution), more or less elevated, decussated with numerous regular, elevated, and transverse lines; the lines are impressed with extremely fine and dense perpendicular striæ; the aperture round.

A very thick ovate shell; the varices vary much in magnitude, so that in some specimens they are nearly obsolete, but the large encircling lines are always conspicuous; the dense striations upon the lines are only visible under a magnifier.

*Locality.* Minchinhampton Common, where it is rare; but it occurs not unfrequently in the middle division of the Inferior Oolite.

TROCHUS SPIRATUS, *D'Archiac*. Plate XIII, figs. 6, 6*a*. Plate X, figs. 2, 2*a*, 2*b*.

TROCHUS SPIRATUS, *Archiac*. 1843. Mém. Soc. Géol. de France, tom. v, p. 378, t. 29, fig. 4*a*—*c*.

— — *Bronn*. 1848. Index Palæont., p. 1306.

— — *D'Orb*. 1850. Prod. Paléont., p. 300.

*T. Testá conicá, apice acuto, anfractibus (4—5) lateribus planis, subtèr medio subangulatis, cingulis et lineis ornatis; cingulis duobus, primo propè suturam approximato, secundo majori, acuto, parte inferiore anfractuum sito; lineis inter cingulos striis longitudinalibus impressis; basi lævi subconvexá, umbilico nullo.*

Shell conical, apex acute, whorls 5, their sides flattened, somewhat angulated beneath their middle portions, and encircled with bands and lines; the bands are two in number; the first is wide, flattened, and placed close to the suture; the second is prominent, acute, forming a slight angle, and placed near to the base of the whorls; between the bands are several rather obscure encircling lines, which are indented by longitudinal striæ; base smooth, slightly convex; no umbilicus.

The variation in the prominence of the bands, of the lines, and of the general state of preservation, occasions considerable diversity in the aspect of this species, and requires

several examples for its elucidation. The figures given at Plate X, figs. 2, 2*a*, 2*b*, do not exhibit the degree of angularity in the whorls and prominence in the bands which is usually seen, and the longitudinal indentations are more than usually prominent. The fine encircling striæ, although not shown in the specimen figured by M. D'Archiac, are particularly mentioned in the description of the species. The axial and basal diameters are nearly equal.

*Locality.* It is tolerably abundant in the Minchinhampton district, occurring in all shelly beds. Eparey, France.

### CLASS—ANNELIDES, *Cuvier*.

SERPULA OBLIQUE-STRIATA. Plate V, fig. 19, 19*a*.

*L. Testâ vermiformi, lateribus subcompressis, striis crebris irregularibus, obliquis anticè curvatis, in cristam longitudinalem flectis.*

Shell vermiform, the sides slightly compressed, with striæ closely arranged, irregular, oblique, curved towards the anterior extremity, and bent into a longitudinal ridge.

*Locality.* It is rare, and occurs in the planking of Minchinhampton Common. Of the few specimens seen, none exceed an inch in length, and 2 lines in their transverse diameter.

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#### Note on the term "PLANKING."

It will be observed that the term "*planking*" is frequently used in stating the position and range of fossils from Minchinhampton Common. This is a name applied indifferently by quarrymen to any stone, the beds of which divide into thin horizontal slabs or planks. At Minchinhampton Common it is understood to indicate the uppermost of that series of shelly beds which are known as the *weatherstones*, or stones which are supposed to be capable of resisting the disintegrating action of frost. At Bussage and Eastcombs the term *white stone* is employed by quarrymen when speaking of this bed, which at the two latter localities has quite changed its mineral character. It is not improbable that this white stone is the English representative of the *pierre blanche* of the Great Oolite of Normandy, which has yielded to M. Deslongchamps so numerous a series of shells.

# THE MOLLUSCA

## OF

### THE “GREAT OOLITE OF YORKSHIRE.”

#### CLASS—CEPHALOPODA.<sup>1</sup>

BELEMNITES GIGANTEUS, *Schloth.* Plate XIV, figs. 4, 4a.

	BELEMNITES GIGANTEUS, <i>Schloth.</i> 1813. Min. Taschenb., vii, p. 70.
—	— <i>Schloth.</i> 1820. Petref., p. 45, No. 1.
—	ELLIPTICUS, <i>Miller.</i> 1823. Geol. Trans., 2d Series, ii, pl. 8, figs. 14—16.
? —	— <i>Blainville.</i> 1827. Mém. Belemn., p. 102.
? —	GLADIUS, <i>Blainville.</i> 1827. Mém. Belemn., p. 86, pl. 2, fig. 10.
? —	COMPRESSUS, <i>Sow.</i> 1828. Min. Con., t. 590, fig. 4.
—	AALENSIS, <i>Voltz.</i> 1830. Mém., p. 60, pl. iv, fig. 7.
—	— <i>Zieten.</i> 1830. Pet. Wurtemb., pl. 19, fig. 1.
—	GRANDIS, <i>Zieten.</i> 1830. Pet. Wurtemb., pl. 20, fig. 1.
? —	COMPRESSUS, <i>Phil.</i> 1835. Geol. of Yorksh., vol. i, pl. 9, fig. 38.
—	AALENSIS, <i>Phil.</i> 1835. Geol. of Yorksh., vol. i, p. 124.
—	GIGANTEUS, <i>Quenstedt.</i> 1843. Flözg. Würtemb., p. 329.
—	— <i>D'Orb.</i> Ter. Jurrass., pl. 14, fig. 15.
—	— <i>D'Orb.</i> Prod. Paléont., p. 261.

*B. Testá elongatá, compressá, crassá, acuminatá vel subinflatá, posticé acuminatá, lateraliter sulcatá, anticè dilatatá; aperturá suborali. Alveolo angulo, 20—25°. (D'Orb.)*

<sup>1</sup> The following species of Mollusca are chiefly figured from the collection of Mr. Bean, and the localities are given upon the authority of that gentleman. They include all the species of univalves enumerated by Professor Phillips as occurring in the “Gray Limestone or Oolite of Cloughton, Brandsby, and Cave” (“Geol. of Yorkshire,” vol. i, p. 123, &c.); and most of the specimens illustrated in this Monograph appear to have been obtained from the Yorkshire coast. We have previously assigned our reason for keeping the fossils of this locality distinct from those of the West of England, and shall merely introduce the following general remarks by Prof. Phillips as bearing upon the subject. “The distribution of the organic remains in the ‘road-stone,’ or slaty rock of Brandsby, Cave Oolite, and Inferior Oolite sand, has yet been carefully ascertained at only a few points; and the following observations will probably here-



The guard is more or less elongated and compressed, sometimes conical and acuminate towards the extremity; at other times contracted near the apex, and enlarged rather suddenly towards the alveolus; the furrows, with which the extremity is marked, vary in different specimens, both in their number, depth, and size; there are generally two on the dorsal part, one being prolonged much more than the other. The angle of the alveolar cavity varies, according to M. D'Orbigny, from 20 to 25°, and is inclined towards the ventral side. The aperture is generally of an oval form.

This is a very variable species, and has consequently been described under a great variety of names. M. D'Orbigny, after carefully studying a large number of specimens obtained from many localities, infers that the variety of form assumed by this species is mainly to be attributed to sexual differences.

This species is generally considered to be characteristic of the Inferior Oolite in England, Germany, and France; but we have not been enabled to detect any specific difference between the specimens forwarded by Mr. Bean, from the Bath Oolite of Yorkshire, under the names of *B. Adensis*, *B. compressus*, and typical specimens of the *B. giganteus*, obtained from the Brown Jurassic formation of Wurtemberg.

*Locality.* The Gray Oolite near Scarborough. Inferior Oolite of the west and south of England.<sup>1</sup>

AMMONITES MACROCEPHALUS, *Schloth.* Plate XIV, fig. 2.

AMMONITES MACROCEPHALUS, <i>Schloth.</i> 1813. Min. Taschenb., vii, p. 70.	
—	— <i>Schloth.</i> 1820. Petref., p. 70, No. 16.
—	— <i>Zieten.</i> 1830. Pet. Wurtemberg, t. v, figs. 1, 4, 7; t. xiv, fig. 3.
—	— <i>Quenstedt.</i> 1843. Flözg. Würtemb., p. 363.
—	— <i>D'Orb.</i> Ter. Jurrass., p. 430, pl. 151.
—	— <i>D'Orb.</i> Prod. Paléont., p. 297.
? —	TEREBRATUS, <i>Phil.</i> 1835. Geol. of Yorksh., vol. i, p. 116.

after receive several corrections. At present it appears to me that the 'road-stone' is characterised by the great abundance of *Gervillia acuta* and *Crassina minima*, and by the presence of *Pholadomya acuticostata*, *Rostellaria composita*, and the genus *Actæon*. Where this rock is united with the Middle Oolite, as at White Nab, these fossils commonly lie near the top; where it is entirely deficient (as at Ewe Nab), they are scarcely to be found. The top of the Cave Oolite (as under Gristhorpe Cliffs, at Ewe Nab, Owlston, and Ellerker) is generally marked by abundance of *Millepora staminea*, and plates and spines of *Echini*, and columnar joints of *Pentacrinus caput Medusæ*. In the substance of the rock occur *Belemnites*, *Isocardia*, *Pholadomya*, *Cucullæa*, *Perna*, *Pinna*, *Plagiostoma*, *Pectines*, and *Terebratula*. So large a proportion of its organic contents occurs likewise in the Inferior Oolite sand beneath, that it is difficult to point out what seem to be characteristic."

<sup>1</sup> We have had the opportunity of examining some fine specimens of this species in the collections of Mr. Bowerbank and Mr. Baber.

*A. Testá discoidéa, subinflatá; anfractibus involutis subcompressis, rotundatis, lateribus 26—30 costatis; costis subrotundatis, obtusis, in medio laterum bi vel trifurcatis continuis; aperturá semilunari, umbilico angustato.*

A discoidal, somewhat inflated, shell, with rather subcompressed volutions, and a narrow and deep umbilicus; margin of the umbilicus with 26 to 30 obtusely-rounded ribs, which subdivide into two or three smaller ones in passing over the back; aperture semilunar, deeply impressed by the previous volution.

*Locality.* Near Scarborough.

AMMONITES BLAGDENI, *Sow.* Plate XIV, fig. 3a, b.

AMMONITES BLAGDENI, *Sow.* 1813. *Min. Con.*, pl. 201.

— CORONATUS, *Schloth.* 1813. (Not *Am. coronatus*, Brug., 1789.)

— — Zieten. 1830. *Pet. Wurtemb.*, t. i, fig. 1.

— BLAGDENI, *Phil.* 1835. *Geol. of Yorksh.*, vol. i, p. 124.

— CORONATUS, *Quenstedt.* 1843. *Floz. Würtemb.*, p. 326.

— BLAGDENI, *D'Orb.* *Ter. Jurrass.*, p. 396, t. 132.

*A. Testá discoidéa, subcylindricá, latè umbilicatá; anfractibus subdepressis, lateribus declivibus, costatis; costis 20—28 externè tuberculatis, subacutis; dorso subconvexo, transversim costato; aperturá transversá, quadrangulári.*

A discoidal, thick, and widely-umbilicated shell, formed of rather depressed quadrangular volutions, ornamented with 20 to 28 obtuse costæ, terminating in spiniform tubercles on the outer margin, and from each of which arise 3 to 5 smaller costæ, which pass over the back; the aperture is transverse and quadrangular.

In some specimens the tubercles are sharper, differently formed, and more numerous than in others.

In the shell figured, which measures about six inches diameter, there are 17 marginal ribs: in another specimen from the same locality (Scarborough), about one foot in diameter, the number is 28. The numerical proportion of these costæ, however, do not always increase or decrease with regularity during the progress of growth. There are two specimens of *Am. coronatus*, Zieten, in the British Museum, which are certainly identical with our shell, in one of which the inner volution has 25, and the outer 27, marginal costæ, showing an increase; in the other specimen, the inner whorl has 21, and the outer only 17 costæ, showing a decrease in their number. The specimen figured by M. D'Orbigny has only 15 tubercular costæ surrounding the umbilicus.

*Locality.* Near Scarborough; Inferior Oolite, Somerset; Bayeux, &c., France; Brown, Jura δ, Stuiffen, Wurtemberg. (*Quenstedt.*)

AMMONITES BRAIKENRIDGII, *Sow.* Plate XIV, fig. 1.

AMMONITES TRIPTOLEMUS, *Bean.* MS.  
 ? — BRAIKENRIDGII, *Sow.* 1813. *Min. Con.*, t. 184.  
 — — *D'Orb.* *Ter. Jurrass.*, t. 135, figs. 2, 3.

*A. Testâ discoided, anfractibus (5—6) expositis, subrotundatis, costatis; costis (30—36) externè tuberculatis, in medio laterum bifidis, subindè trifidis, continuis; dorso subconvexo; aperturâ transversâ, subdepressâ, externè angulatâ.*

A discoidal shell, with 5—6 exposed, somewhat rounded and costated volutions; with 30—36 marginal costæ, tuberculated externally, from each of which arise, about the middle of the side, 2 and sometimes 3, rather obtuse smaller ribs, passing over the back; aperture wider than high, somewhat convex, with angular sides.

This Ammonite (forwarded to us with the name, *A. Triptolemus*), belonging to the section *Coronarii*, appears to be intermediate to *A. Humphriesianus* and *A. Braikenridgii*, with the latter of which it is the more closely allied, but differing from it by the smaller costæ (in the cast) not being wholly enveloped by the later volutions. We regard the specimen figured as only the adult state of this species.

*Locality.* Near Scarborough.

## CLASS—GASTEROPODA.

ALARIA PHILLIPSII, *D'Orb.* sp. Plate III, fig. 5; and Plate XV, figs. 15, 15a.

? ROSTELLARIA HAMUS, var.  $\beta$ , *Deslongchamps.* 1842. *Mém. Soc. Linn. de Normandie*, tom. vii, p. 174, t. 9, fig. 36.

(See description, *antea* page 18.)

We have provisionally retained (page 18) M. D'Orbigny's specific name for the Yorkshire shell, believing that the one figured as *Rostellaria composita*, by Phillips, presented certain differences from that described in the '*Min. Conch.*,' occurring in the Oxford Clay of Weymouth. But Mr. Sowerby distinctly states that he has received the same species from near Scarborough, so that the differences may prove, when a larger number of specimens shall have been examined, to be due merely to variations arising from local conditions. The Yorkshire shell appears to be identical with *Rostellaria hamus*, var.  $\beta$ , of M. Deslongchamps, cited above, from the Great Oolite of Ranville.

*Locality.* Near Scarborough. This species is also found in the Inferior Oolite of Yorkshire, and in the same formation at Dundry and Bridport.



## CERITHIUM BEANII. Plate XV, fig. 5.

*C. Testá parvá, turrítá, apice obtuso, anfractibus numerosis angustis, subplanis, 5 costatis; costis tuberculosis, tuberculis circa 16 in ambitu; costis inæqualibus; suturis anfractibus profundè depressis.*

Shell small, turreted; apex obtuse; volutions numerous, narrow, rather flattened, encircled with five rows of costæ; costæ tuberculated, the tubercles being about 16 in a volution; ribs unequal; the sutures of the whorls deeply depressed.

The third and fifth row of costæ are less prominent than the others, the tubercles are large and prominent, the length of a volution is less than half its transverse diameter, the first two volutions are nearly smooth. Length 5 lines, transverse diameter 2 lines.

*Locality.* Near Scarborough.

## NATICA ADDUCTA. Plate XV, figs. 17, 17a.

NATICA ADDUCTA, *Phillips*. 1835. Geol. of York., vol. i, t. 9. fig. 30.

— — *Williamson*. Geol. Trans., 2d Series, vol. v, p. 241.

— — *D'Orb.* 1850. Prod. Paléont., p. 264.

*N. Testá globosá, spirá clatá, anfractibus (4) convexis, supernè rotundatis, suturis depressis, anfractu ultimo obliquo; aperturá ellipticá, umbilico oblecto.*

Shell globose, spire elevated and pointed, whorls (4) convex, with depressed sutures, their upper portions rounded; the last whorl oblique; aperture large, elliptical; inner lip with a covered umbilicus.

*Natica grandis*, Goldfuss, is our only Great Oolite species which approaches near to this form; but that shell, though greatly expanded, has not more volutions than the present species, a fact which militates greatly against their identity. Length 9 lines, breadth 8 lines.

*Locality.* Great Oolite near Scarborough. The original specimen figured by Phillips.

## NATICA PUNCTURA. Plate XV, figs. 18, 18a.

LITTORINA PUNCTURA, *Bean*. 1839. Mag. Nat. Hist., p. 62, fig. 23.

— — *Morris*. 1843. Cat. Brit. Foss., p. 149.

*N. Testá ovato-ventricosá, spirá clatá, acutá; anfractibus (6) convexiusculis, suturis profundè impressis; anfractu ultimo magno, punctato et cingulato; punctis minutis, in*

*lineis transversis sed irregularibus instructis, et lineis tenuissimis longitudinalibus transversisque decussatis; aperturá ovatá, labro externo tenui.*

Shell ovately ventricose, spire elevated and pointed, whorls (6) rather convex, with deep sutures; the last whorl large, oblique, its surface punctated and cingulated; punctæ minute, disposed in close but irregular arranged transverse lines; they are decussated by numerous very fine lines, both longitudinal and transverse; the entire surface of the whorl is likewise divided into several (4 or 5) encircling zones by as many lines, which are prominent, rendering the spaces between them rather flattened; aperture ovate, outer lip thin, inner lip rather flattened and excavated. Axis 11 lines, transverse diameter 8 lines.

The following is Mr. Bean's original notice of this species:

"Shell turbinated, finely striated longitudinally and transversely, which, under a high magnifier, gives it a very beautiful appearance; whorls (6) rounded and well divided, the body whorl occupying one half the length of the shell. Aperture elliptical, pillar lip thick and a little flattened, outer lip very thin; length nearly  $\frac{3}{4}$  inch, breadth  $\frac{1}{2}$  inch. The only specimen procured from the Cornbrash; but in the Inferior Oolite at Peak Hill it is not uncommon. The specimens found there are larger, coarser, and the spire is not so much produced."

*Locality.* Bath Oolite near Scarborough. In the collection of Mr. Morris.

NATICA ? (EUSPIRA) CINCTA. Plate XV, fig. 20.

PHASIANELLA CINCTA, *Phillips*. 1835. Geol. of York., vol. i, t. 9, fig. 29.

— — *Williamson*. Geol. Trans., 2d Series, vol. v, p. 241.

— — *D'Orb.* 1850. Prod. Paléont., p. 267.

*N. Testá ovatá, spirá elatá, anfractibus (4) latis, supernè carinatis, suturis canaliculatis: anfractu ultimo, bicarinato; aperturá amplá, suborbiculari.*

Shell ovate, spire elevated, whorls (4) broad, their upper portion with an obtuse encircling carina; the sutures channelled; the last volution, with an obtuse carina, occupying very nearly the middle of the volution; aperture large and suborbicular.

The specimen placed at our disposal, by the kindness of Mr. Bean, is the original one figured by Professor Phillips. It is rather compressed, which gives an appearance of greater breadth to the shell than it possessed; the perfect form would approach our *E. pyramidata*, from which it is distinguished by the second carina, which is not less strongly marked than the upper one. Length 15 lines, breadth (uncompressed)  $10\frac{1}{2}$  lines.

*Locality.* Great Oolite near Scarborough.

## NERITA PSEUDO-COSTATA. Plate XV, figs. 3, 3a.

NERITA COSTATA, *Phillips*. 1835. Geol. of York., vol. i, t. 11, fig. 32.— — *Morris*. 1843. Catalogue, p. 154.— PSEUDO-COSTATA, *D'Orb.* 1850. Prod. Paléont., p. 264.

*N. Testá parvá, subhemisphæricá; spirá parvá, depressá; costis longitudinalibus, regularibus rotundatis et lævibus.*

Shell small, subhemispherical; spire small and depressed; ribs longitudinal, numerous, regular, rounded, and smooth.

This shell appears to be identical with the well-known Inferior Oolite species. Occasionally there is some little irregularity about the costæ, and they are not always so prominent as in the Yorkshire example. Size that of a moderate-sized pea.

*Locality.* Near Scarborough; also in the Inferior Oolite of Yorkshire. (*Phillips*.)

## EULIMA LEVIGATA. Plate XV, fig. 4.

*E. Testá subulato-turritá, apice acuto; anfractibus (11) subconvexis, obsoletè costatis; anfractu ultimo symmetrico.*

Shell subulate, turreted; apex acute; whorls (11) very slightly convex, smooth, or with slightly-marked costæ; the last whorl symmetrical.

This little shell is very subulate, the length of the whorls being nearly equal to their transverse diameter. This character, and the degree of convexity, separates it from a shell very abundant in the Great Oolite at Minchinhampton, which we have described under the title of *Eulima communis*. In that species the volutions are fewer, and the shell is more pyramidal. Length 7 lines.

*Locality.* Near Scarborough.

## CHEMNITZIA? VETUSTA. Plate XV, fig. 7.

TEREBRA VETUSTA, *Phillips*. 1835. Geol. of York., vol. i, t. 9, fig. 27.— — *Williamson*. Geol. Trans., 2d Series, vol. v, p. 241.CHEMNITZIA — *D'Orb.* 1850. Prod. Paléont., p. 263.

*C. Testá elongatá, turritá; anfractibus (9) subconvexis, longitudinaliter costatis; suturis depressis; costis circa 12, rotundatis lævigatis curvatis.*

Shell turreted, volutions (9) rather convex, and longitudinally costated; ribs, about 12 in a volution, rounded and smooth, bent from left to right; the sutures of the volutions deeply impressed.



The figure is lengthened, almost subulate, the convexity of the volutions being but slight; their transverse diameter exceeds their length by about one third. Longitudinal dimensions 5 lines, transverse diameter 2 lines.

*Locality.* Near Scarborough.

CERITHIUM GEMMATUM. Plate XV, fig. 6.

*C. Testá parvá, turritá; anfractibus convexiusculis, nodulis cingillatisque 5; nodulis ovatis subdistantibus, circa 24 in ambitu.*

Shell small, turreted; volutions rather convex, encircled with five rows of nodules; nodules ovate, about 24 in a volution; the rows of nodules are slightly curved, and the last volution has from 7 to 9 rows.

The little nodules are regular, oval, their longer diameter being in the axis of the shell, and they are distant from each other about their own diameter; the number of volutions are but few, apparently not more than 7. Length 7 lines, transverse diameter 2 lines.

*Locality.* Great Oolite near Scarborough.

CHEMNITZIA? SCARBURGENSIS. Plate XV, fig. 8.

*C. Testá magná, pyramidato-turritá, leví; anfractibus subplanis ad suturas subplicatis, aut vittá latiusculá transversá, plus minusve convexá notatis; aperturá ovatá, supernè strictissimá; columellá marginatá, supra subcallosá.?*

Shell large, pyramidal, turreted, smooth; whorls nearly flat, but with one fold near to their sutures, or with a broad transverse band more or less convex; aperture ovate, very narrow above; columella marginated, thickened above.

The upper border of the whorls is slightly turned, their junctions are strongly defined. The longitudinal diameter of the penultimate whorl is 7 lines, the transverse diameter 10 lines.

*Locality.* The specimen forwarded to us by Mr. Bean is from the dark-gray shale of the Great Oolite near Scarborough. It is only a cast, and much compressed, so that the specific character cannot be sufficiently determined.

TROCHUS LECKENBIL. Plate XV, figs. 21, 21a.

*T. Testá conico-depressá, anfractibus (4—5) planis, costulis rotundatis crebris cinctis:*

*costulis transversè dense-striatis; basi subconvexâ densè costulatâ et concentricè striatâ; umbilico nullo.*

Shell conical, but depressed; whorls (4—5) flattened, encircled with closely-arranged, nearly equal rounded ribs; the ribs are densely striated longitudinally; the base is rather convex, having very closely-arranged costæ, crossed by concentric striæ; no umbilicus.

The junctions of the whorls are rather obscurely marked, and the lower margin of the last whorl is angulated. The little ribs upon the base are very delicate and fine; the outer lip is imperfect, and does not enable us to describe the aperture; but there is nothing visible upon the surface of the whorls which would indicate that it belongs to *Pleurotomaria*. The height is two thirds of the basal diameter.

*Locality.* Scarborough. In Mr. Leckenby's cabinet.

*TROCHUS MONILITECTUS, Phil.* Plate XV, figs. 1, 1*a*.

*TROCHUS MONILITECTUS, Phil.* 1835. Geol. of York., vol. i, t. 9, fig. 33.

— — *D'Orb.* Prod. Paléont., p. 265.

*T. Testâ conicâ, anfractibus (8) planis, suturis obscuris 4—5 costatis; costis crebris obliquè crenulatis.*

Shell conical, volutions (8) flattened, with indistinct sutures, and encircled with 4—5 rows of costæ; the costæ are closely arranged, and crenated obliquely.

The costæ are large, the crenations closely arranged, and pass obliquely from left to right. Length  $4\frac{1}{2}$  lines, basal diameter  $3\frac{1}{2}$  lines.

*Locality.* Near Scarborough. The original specimen figured by Phillips.

*TURBO ELABORATUS, Bean.* Plate XV, fig. 2, 2*a*; and Plate IX, figs. 27, *var.*

*TURBO ELABORATUS, Lycett.* 1850. An. Nat. Hist., vol. vi, p. 416, pl. 11, fig. 1.

*T. Testâ subturritâ, apice acuto, anfractibus (4) subconvexis, supernè planis, infernè costulis longitudinalibus numerosis, aliis transversis decussantibus; anfractu ultimo ventricoso obliquo, aperturâ ovatâ.*

Shell turreted, apex acute, whorls (4) convex, their upper borders flattened horizontally, their sides and lower portions, with numerous longitudinal ribs, transversely decussated by others; last whorl oblique; aperture entire, ovate.

The longitudinal ribs are rendered nodulous by those which are transverse; the latter are 4 or 5 in number; the last volution has numerous encircling ribs, but the longitudinal ones do not extend beyond the middle of the volution; and when more than four whorls have been completed, the last whorl is destitute of longitudinal ribs, but in lieu of them are

very fine densely-arranged longitudinal lines. The latter features are not exhibited by the specimen from Scarborough; but one, of more advanced growth, from the Inferior Oolite near Minchinhampton, is much larger and more satisfactory. The upper portions of the whorls are flattened, smooth, and even a little sulcated; the inner lip is thin; the base is rounded, so that it neither exhibits the thickened lip of *Littorina*, nor the basal produced form of *Turbo*. Length of the Scarborough specimen 5 lines, transverse diameter of the last whorl 4 lines.

*Locality.* Great Oolite near Scarborough.

TURBO PHILLIPSII. Plate XV, figs. 12, 12a, b.

*T. Testá trochiformi, cingillatáque costatá; costis striato-nodulosis; striis indentis; striis longitudinalibus numerosissimis; anfractibus planis; aperturá subrotundá, basi effusá, vel productiori.*

Shell trochiform, encircled with numerous ribs; ribs striated and nodulous; striae longitudinal, very numerous, indenting the ribs; volutions flattened; aperture rounded; its base effuse, or produced anteriorly.

Two ribs, more prominent than the rest occupy the middle of the last whorl, and give it rather an angulated figure; the pointed extremity of the base removes it from the *Littorinae*. Longer diameter 9 lines, transverse diameter 7 lines.

Named in compliment to the author of the 'Geology of Yorkshire.'

*Locality.* Great Oolite near Scarborough.

PHASIANELLA LATIUSCULA. Plate XV, fig. 16.

*P. Testá ovatá, spirá acutá, elatá; anfractibus (6) latis, convexiusculis; anfractu ultimo subventricos.*

Shell ovate, spire acute, elevated; whorls (6) broad, convex, the last whorl rather inflated.

This may be considered as a form connecting our *P. elegans* and *P. tumidula*; the spire is much more elevated than in the latter species, and the whorls are wider than in the former. These remarks, however, are made with the reservation which must be exercised in describing casts, for the specimen figured is in that condition. The length is 1 inch, the transverse diameter 7 lines.

*Locality.* Near Scarborough.



PHASIANELLA STRIATA, *Sow.* Plate XV, fig. 19.

MELANIA STRIATA,	<i>Sow.</i> 1814. Min. Con., tab. 47.
PHASIANELLA STRIATA,	<i>Sow.</i> Min. Con., 1834. Index, p. 5.
TEREBRA	— <i>Lonsdale.</i> Geol. Trans., 2d Series, vol. iii, p. 275.
—	— <i>Morris.</i> 1843. Cat. Brit. Foss., p. 163.
MELANIA	— <i>Roemer.</i> 1836. Nordd. Oolith., p. 158, t. 10, fig. 1.
—	— <i>Goldf.</i> 1844. Petref., p. 112, t. 198, fig. 12.
PHASIANELLA	— <i>D'Orb.</i> 1850. Prod. Paléont., p. 333.

*P. Testá turritá, ventricosá; anfractibus (7) subconvexis et striatis; striis (15) transversis; basi profundè striatá; aperturá depressá, suborbiculari; columellá excavatá.*

Shell turreted, ventricose; whorls (7) somewhat convex and striated; striæ but faintly impressed, and about 15 in number upon each whorl; the base deeply striated; aperture depressed, nearly circular; columella excavated.

The figure is subpyramidal, the length of the whorls being rather more than half their transverse diameter; the sutures of the whorls are deeply marked, the base of the last whorl is deeply grooved; the base of the aperture is very wide, and the transverse diameter of the aperture is nearly equal to the longitudinal. The length of the entire shell is about 3 inches, the transverse diameter through the last whorl is 21 lines.

*Locality.* Great Oolite near Scarborough. In the middle and west of England this species occurs in the upper beds of the Inferior Oolite and Coral Rag.

ACTEON, *Montfort.* 1810.TORNATELLA, *Lam.*

Shell ovate, volutions few, transversely striated; spire obtuse; aperture narrow, lengthened, entire; columella spirally thickened at its junction with the inner lip; outer lip thin, smooth.

ACTEON SEDGVICI, *Phil.* sp. Plate XV, figs. 9, 9a.

AURICULA SEDGVICI,	<i>Phil.</i> 1835. Geol. of York., vol. i, t. 11, fig. 33.
—	— <i>Williamson.</i> Geol. Trans., 2d Series, vol. v, p. 241.
—	— <i>Bronn.</i> 1848. Index Palæont., p. 136.
ACTEON	— <i>D'Orb.</i> 1850. Prod. Paléont., p. 263.

*A. Testá parvá, ellipticá, transversè striato punctatá; striis crebris, punctis impressis; spirá subconicá, gradatá; anfractibus subplanis, ultimo inflatu; aperturá elongato-ellipticá, angustatá.*

Shell small, elliptical, transversely striated, the striæ numerous and punctated; the spire conical, step-like; the whorls rather convex, the last inflated; the aperture is an elongated ellipse, narrow above and beneath.

The Yorkshire specimen, placed at our disposal by Mr. Bean, is much compressed and imperfect, and has the spire somewhat less elevated than the following species, which resembles one figured by M. Deslongchamps from the Inferior Oolite of Les Moutiers, near Bayeux. The species has not been found in the middle or west of England. Longitudinal diameter 5 lines, transverse 3 lines.

*Locality.* Great Oolite near Scarborough.

ACTÆON PULLUS. Plate XV, fig. 11.

? TORNATELLA PULLA, *Koch.* 1837. Nordd. Oolith., p. 33, t. 2, fig. 11.

?? — PULCHELLA, *Deslongchamps.* 1848. Mém. Soc. Linn. de Normandie, viii, pl. 18, figs. 4a, 4 b. (*striis remotis.*)

*A. Testá ovatá, spirá elatá, subacutá; anfractibus (6) convexiusculis, striis transversis numerosis regularibus et punctatis; anfractu ultimo subcylindrico; aperturá ovatá.*

Shell ovate, spire elevated, somewhat acute; whorls (6) convex, the last whorl subcylindrical; aperture ovate; the surface with numerous regular punctated encircling striæ.

As compared with *A. Sedgwicki*, of which it may prove to be only a variety, this is much more elongated, the length of the aperture but very slightly exceeding half of the entire length of the shell; the volutions are convex, and of moderate breadth; the base is rounded, but narrow. Length  $3\frac{1}{2}$  lines, transverse diameter 2 lines.

*Locality.* Great Oolite of Scarborough. It has not been found in the middle or west of England.

#### ACTÆONINA, *D'Orbigny.*

ACTÆONINA GIGANTEA, *Desl.* sp. Plate XV, fig. 13.

TORNATELLA GIGANTEA, *Deslongchamps.* 1842. Mém. Soc. Lin. de Normandie, vol. vii, pl. 10, figs. 27, 28.

ACTÆONINA DESLONGCHAMPSII, *D'Orb.* 1850. Prod. Paléont., p. 299.

*A. Testá ovato-turritá, spirá elatá, apice acuto; anfractibus subplanis, supernè rotundatis; aperturá angustá, basi dilatátá; columellá ad basin marginatá.*

Shell ovate, turreted; spire elevated, acute; whorls rather flattened at their sides, but rounded above; aperture narrow above, dilated below; columella marginated at its base.

The specimen forwarded to us from Yorkshire is only a cast, but there is no doubt of

its identity with the Normandy species, which is from the Great Oolite of Ranville. It likewise occurs in the upper beds of the Inferior Oolite near Minchinhampton. Length 21 lines, breadth 10 lines; the aperture is about three fifths of the entire length of the shell.

*Locality.* Bath Oolite near Scarborough.

ACTEONINA GLABRA, *Phil.* sp. Plate XV, fig. 10.

ACTEON GLABER, *Phil.* 1835. Geol. of York., vol. i, t. 9, fig. 31.

— — *Williamson.* Geol. Trans., 2d Series, vol. v, p. 241.

UTRICULUS — *Brown.* Ill. Foss. Con., p. 101, t. 47, fig. 30.

ACTEONINA GLABRA, *D'Orb.* 1850. Prod. Paléont., p. 264.

*A. Testá subcylindricá, apice obtuso, spirá parvá; anfractibus (5) angustis, subconvexis; anfractu ultimo cylindrico; aperturá angustá, basi effusá.*

Shell subcylindrical, apex obtuse, spire small, whorls (5) narrow, rather convex; last volution cylindrical; aperture rounded, and expanded beneath.

The spire is very blunt and depressed, the volutions being very narrow, and without the slightest angularity. Length 8 lines, transverse diameter 4 lines.

*Locality.* Great Oolite near Scarborough. In Gloucestershire it is only found in the Inferior Oolite.

ACTEONINA TUMIDULA. Plate XV, fig. 14.

*A. Testá parvá, spirá exertiusculá; anfractibus angustis, rotundatis, suturis depressis; anfractu ultimo subcylindrico; aperturá elongato-ovatá.*

Shell small, spire depressed, volutions very narrow, rounded, their sutures deeply depressed; the last whorl gibbous; aperture an elongated oval.

This species is shorter than any other of the genus with which we are acquainted. The figure of the last whorl is only moderately cylindrical; and the transverse diameter of this portion is not much less than the entire length of the shell. Length  $4\frac{1}{2}$  lines, transverse diameter  $3\frac{1}{2}$  lines.

*Locality.* Near Scarborough.

#### ANNELLIDA.

VERMICULARIA NODUS, *Phil.* Plate XIV, figs. 8a, b.

VERMICULARIA NODUS, *Phil.* 1835. Geol. of York., vol. i, p. 124, t. 9, fig. 34.

*V. Testá lævi, in spiram turbinatam convolutá, anfractibus (3) convexiusculis; anfractu ultimo ad basin convexo, et lineá obsoletá submesá cincto.*

Shell smooth, forming an obtuse turbinated spire, with three volutions, which are



rather convex; the last whorl rounded towards the base, with an obscure encircling line placed a little beneath the middle of the whorl; aperture not exposed.

*Locality.* Scarborough, Westow, and Whitwell; also in the Cornbrash. (*Phillips*.)

SERPULA PLICATILIS, *Goldf.* Plate XIV, figs. 5*a*, *b*, *c*.

SERPULA PLICATILIS, *Goldfuss*. 1833. *Petref.*, p. 229, t. 68, fig. 2.

*S. Testá laxá vel curvatá, lateribus subconvexis, læviusculis, costulis arcuatis per paria approximatis; cariná continuá rectá.* (*Goldf.*)

Shell loose or unwound, irregularly curved, slender, rather convex, smooth; the sides have little, obscure, closely-arranged, curved costæ, not visible upon the majority of specimens; the dorsal carina is simple, continuous, but not much elevated or conspicuous.

This minute species was gregarious, a considerable number being clustered upon a small *Pecten*.

*Locality.* Scarborough.

SERPULA SULCATA, *Sow.* Plate XIV, fig. 6.

SERPULA SULCATA, *Sow.* 1829. *Min. Con.*, t. 608, figs. 1, 2.

*S. Testá sublaxá aut curvatá, lævi, subcarinatá; cariná dorsali lævigatá; sulcisque angustis carinæ approximatis; lateribus subplanis.*

Shell partially unrolled, curved, smooth; dorsal carina smooth, with a narrow sulcus on each side of it; sides of the shell rather flattened; lines of growth visible upon different portions of the surface.

The mode of growth in this species appears to have been very irregular. In its young state it was flattened at the sides, but subsequently became much more rounded; and the figure of the aperture is nearly orbicular.

*Locality.* Scarborough. Inferior Oolite near Stroud.

SERPULA INTESTINALIS, *Phil.* Plate XIV, fig. 7.

SERPULA INTESTINALIS, *Phil.* 1835. *Geol. of York.*, vol. i, p. 110, t. 5, fig. 21.

*S. Testá sublaxá, lævi, compressiusculá, sulco læviter depresso, supernè et infernè sitá.*

Shell smooth, partially unrolled, somewhat compressed above and beneath with a slight longitudinal sulcus in the middle of the two flattened sides.

This species is destitute of a carina, nor are any lines of growth visible; the sulcations are only to be seen upon the unrolled portion of the shell.

*Locality.* Bath Oolite, Scarborough; also in Oxford Clay and Cornbrash. (*Phillips*.)



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## CORRIGENDA.

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|--|--|
| Page 1. Line 18, for <i>Hailsworth</i> read <i>Nailsworth</i> .<br>„ 2. In foot-note, line 6, for <i>Nuns</i> read <i>Nunnery</i> .<br>„ 3. Line 26, after <i>Gresslya</i> , erase the word <i>or</i> , and place a „<br>„ 4. Line 33, for <i>Pterocera</i> read <i>Alaria</i> .<br>„ 8 and 9. <i>The two Belemnites occur also at Minchinhampton</i> .<br>„ 16. To the last line add, <i>wing simple, undivided</i> . | Page 49. <i>Chemnitzia Lonsdalii</i> , <i>Plate VIII</i> , read <i>Plate VII</i> .<br>„ 62. <i>Trochus squamiger</i> , <i>Plate X</i> , <i>figs. 2, 2a, 2b</i> , read <i>Plate IX, figs. 31, 31a</i> .<br>„ 86. Line 26, for <i>with</i> , read <i>to</i> .<br>„ 96. Line 24, for <i>Loliolum</i> read <i>doliolum</i> .<br>„ 99. Line 8, after “remaining species,” read <i>to the species of section B</i> . |
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# INDEX

OF

## SPECIES RETAINED IN THIS WORK.

[I. O., or C-b., *affixed*, shows that the species also occurs in the *Inferior Oolite*, or *Cornbrash*.]

	Page	Plate		Page	Plate
ACTÆONINA			CERITELLA		
bulinoides	104 . . 8, f. 15.		acuta	37 . . 5, f. 17, <i>a</i> ; f. 18, <i>a</i> .	
olivæformis	103 . . 8, f. 14.		conica	39 . . 5, f. 10, <i>a, b, c</i> .	
? parvula	104 . . 5, f. 11, 11 <i>a</i> , 12.		gibbosa	39 . . 9, f. 17.	
ALARIA			longiscata	40 . . 9, f. 14.	
armata	16 . . 3, f. 1, 1 <i>a</i> .		mitralis	39 . . 5, f. 15.	
atractoides	19 . . 3, f. 7, 7 <i>a</i> .		planata	38 . . 5, f. 14, 14 <i>a</i> .	
cirrus	22 . . 3, f. 13, 13 <i>a</i> .		Sowerbii	38 . . 5, f. 16.	
hamulus	17 . . 3, f. 4, <i>a, b</i> .		rissoides	40 . . 9, f. 7.	
hamus	16 . . 3, f. 2, <i>a, b</i> .		unilineata	38 . . 5, f. 13; 13, f. 8.	
hexagona	19 . . 3, f. 8.		CERITHIUM		
lævigata	17 . . 3, f. 3, 3 <i>a</i> .		limæforme	30 . . 7, f. 2.	
pagoda	18 . . 3, f. 6; 13, f. 4.		pentagonum	30 . . 9, f. 22.	
paradoxa	20 . . 3, f. 9, 10; 13, f. 3.		Roissii	32 . . 7, f. 14, <i>a</i> .	
„ (var.)	20 . . 3, f. 9 <i>a</i> .		sexcostatum	30 . . 7, f. 3, <i>a</i> .	
parvula	22 . . 3, f. 12, 12 <i>a, b</i> .		strangulatum	31 . . 9, f. 22.	
Phillipsii	18 . . 3, f. 5, <i>a</i> . I.O.		quadricinctum	29 . . 9, f. 8.	
trifida	21 . . 3, f. 11, <i>a, b, c</i> . C-b.		Tennantii	32 . . 9, f. 22.	
AMMONITES			CHEMNITZIA		
arbustigerus	12 . . 2, f. 4, 4 <i>a</i> .		Hamptonensis	50 . . 7, f. 1, <i>a</i> .	
gracilis	12, 105, 1, f. 3, <i>a</i> ; 13, f. 2, <i>a</i> .		Leckenbyi	50 . . 7, f. 4.	
macrocephalus	12 . . 2, f. 3, <i>a</i> .		Lonsdalei	49 . . 7, f. 13, <i>a</i> .	
subcontractus	11 . . 1, f. 1, 1 <i>a</i> .		phasianoides	51 . . 9, f. 5.	
„	Jun. f. 2, 2 <i>a</i> .		simplex	49 . . 7, f. 15.	
Waterhousei	13 . . 1, f. 4, <i>a</i> . I.O.		Wetherellii	50 . . 7, f. 5, <i>a</i> .	
BELEMNITES			variabilis	51 . . 8, f. 7, <i>a, b</i> .	
Bessinus	8 . . 1, f. 5, 7.		CYLINDRITES		
fusiformis	8 . . 1, f. 6, 8.		acutus	98 . . 8, f. 9, <i>a, b</i> .	
BRACHYTREMA			altus	99 . . 8, f. 12, <i>a, b</i> .	
Buvignieri	24 . . 5, f. 4.		angulatus	99 . . 8, f. 11, <i>a, b</i> .	
turbiniformis	25 . . 9, f. 35, <i>a</i> .		brevis	101 . . 8, f. 13.	
BULLA			bullatus	102 . . 8, f. 18, <i>a, b, c</i> .	
doliolum	96 . . 8, f. 16, <i>a, b</i> .		cuspidatus	98 . . 8, f. 10, <i>a</i> .	
undulata	96 . . 8, f. 8, <i>a</i> .		cylindricus	100 . . 8, f. 19, <i>a, b, c</i> .	
			excavatus	100 . . 8, f. 17, <i>a, b, c</i> .	

	Page	Plate		Page	Plate
<b>CYLINDRITES</b> ( <i>continued</i> ).			<b>NATICA</b> ( <i>continued</i> ).		
pyriformis	102 . . 8, f. 18, <i>a, b, c.</i>		Stricklandi	42 . . 11, f. 24, <i>a.</i>	
Thorenti	101 . . 8, f. 22, <i>a, b, c.</i>		Tancredi	42 . . 6, f. 11.	
<b>DELPHINULA</b>			Verneuili	44 . . 6, f. 6, <i>a</i> ; f. 7, <i>a.</i>	
alta	71 . . 9, f. 31.		<b>NAUTILUS</b>		
Buckmani	71 . . 5, f. 8.		Baberi	10 . . 1, f. 1, <i>a.</i>	
coronata	70 . . 9, f. 26.		dispanus	9 . . 2, f. 5, <i>a.</i>	
(Sub-genus) <b>CROSSOSTOMA</b> .			subtruncatus	10 . . 1, f. 2, <i>a.</i>	
? discoideum	73 . . 11, f. 7, <i>a, b.</i>		<b>NERINEA</b>		
? heliciforme	73 . . 11, f. 8. I.O.		Dufrenoyi	34 . . 7, f. 8, <i>a—e.</i>	
Prattii	72 . . 11, f. 21, <i>a.</i> I.O.		Eudesii	33 . . 7, f. 6, <i>a</i> ; 13, f. 10.	
<b>DESLONGCHAMPSIA</b>			funiculus	36 . . 7, f. 12, <i>a, b.</i>	
Eugenei	94 . . 12, f. 13, <i>a.</i>		punctata	35 . . 7, f. 10, <i>a, b, c.</i>	
<b>EMARGINULA</b>			Stricklandi	35 . . 9, f. 9, <i>a.</i>	
scalaris	88 . . 8, f. 4, <i>a, b, c.</i> I.O.		Voltzii	32 . . 7, f. 11, <i>a</i> ; Var. f. 7, <i>a</i> ; and 13, f. 11.	
<b>EULIMA</b>			<b>NERITA</b>		
communis	48 . . 9, f. 21, <i>a.</i>		cancellata	56 . . 11, f. 15, <i>a.</i>	
pygmæa	48 . . 9, f. 1.		costulata	57 . . 8, f. 6, <i>a, b, c</i> ; 11, f. 18, <i>a, b.</i> I.O.	
subglobosa	49 . . 9, f. 6.		rugosa	56 . . 11, f. 17, <i>a.</i>	
vagaus	48 . . 9, f. 3, 4.		(Sub-genus) <b>NERIDOMUS</b> .		
<b>EUSPIRA</b>			hemisphaerica	58 . . 11, f. 16, <i>a</i> ; f. 14, <i>a.</i>	
canaliculata	45 . . 11, f. 23, <i>a.</i> I.O.		minuta	58 . . 11, f. 19, <i>a.</i> I.O.	
coronata	46 . . 6, f. 9.		(Sub-genus) <b>NERITOPSIS</b> .		
pyramidata	46 . . 6, f. 8, <i>a.</i>		striata	59 . . 11, f. 13, <i>a.</i>	
Sharpei	46 . . 11, f. 22.		sulcosa	59 . . 11, f. 12. I.O.	
subcanaliculata	47 . . 6, f. 13.		varicosa	106 . . 11, f. 20, <i>a</i> ; 13, f. 5. I.O.	
<b>FISSURELLA</b>			<b>PAGODUS</b>		
acuta	85 . . 8, f. 5, <i>a—c.</i>		sub-genus <b>AMBERLEYA</b> .		
<b>FUSUS</b>			nodosa	55 . . 5, f. 19. I.O.	
coronatus	23 . . 5, f. 5.		<b>PATELLA</b>		
multicostatus	23 . . 5, f. 6, <i>a.</i>		arachnoidea	92 . . 12, f. 9, <i>a.</i>	
subnodulosus.	23 . . 5, f. 9, <i>a.</i>		Aubentonensis	91 . . 12, f. 7, <i>a, b, c, d.</i>	
<b>MONODONTA</b>			cingulata	88 . . 12, f. 4, <i>a, d.</i>	
decussata	68 . . 11, f. 9, <i>a.</i>		inornata	93 . . 12, f. 11, <i>a.</i> I.O.	
formosa	68 . . 11, f. 6, <i>a, b.</i>		nana	93 . . 12, f. 10, <i>a.</i>	
imbricata	67 . . 11, f. 3, <i>a.</i>		Roemeri	91 . . 12, f. 6, <i>a, b.</i>	
Labadyei	68 . . 11, f. 2; Var. f. 11, <i>a.</i>		rugosa	89 . . 12, f. 1, <i>a—g.</i> I.O.	
Lyellii	67 . . 11, f. 4, <i>a, b.</i> I.O.		paradoxa	90 . . 12, f. 2, <i>a, b.</i>	
<b>NATICA</b>			striatula	91 . . 12, f. 5, <i>a, b.</i>	
ambigua	44 . . 6, f. 5.		sulcata	90 . . 12, f. 3, <i>a, b.</i>	
formosa	42 . . 6, f. 10.		suprajurensis	92 . . 12, f. 9, <i>a.</i>	
globosa	43 . . 6, f. 14.		<b>PHASIANELLA</b>		
grandis	41 . . 6, f. 12.		acutiuscula	75 . . 11, f. 28, <i>a.</i>	
intermedia	41 . . 6, f. 1, <i>a.</i>		conica	74 . . 11, f. 30, <i>a.</i>	
Michelini	44 . . 6, f. 2, 2 <i>a</i> ; f. 3, 3 <i>a.</i>				
neritoidea	43 . . 6, f. 4.				



	Page	Plate
<b>PHASIANELLA</b> ( <i>continued</i> ).		
<i>elegans</i>	74 . . 11, f. 27, <i>a</i> .	
<i>nuciformis</i>	75 . . 11, f. 26.	
<i>Leymeriei</i>	74 . . 11, f. 31, <i>a</i> , 32.	
<i>parvula</i>	75 . . 11, f. 20, <i>a</i> .	
<i>tumidula</i>	76 . . 11, f. 25, <i>a</i> .	
<b>PILEOLUS</b>		
<i>lævis</i>	60 . . 9, f. 37, <i>a</i> , <i>b</i> . I.O.	
<i>plicatus</i>	60 . . 9, f. 36, <i>a</i> , <i>b</i> , <i>c</i> . I.O.	
<b>PLEUROTOMARIA</b>		
<i>clathrata</i>	79 . . 10, f. 6, <i>a</i> .	
<i>composita</i>	80 . . 10, f. 13, <i>a</i> .	
<i>discoidea</i>	78 . . 10, f. 12.	
<i>obesa</i>	79 . . 10, f. 11.	
<i>pagodus</i>	77 . . 10, f. 9.	
<i>scalaris</i>	77 . . 10, f. 14.	
<b>PTEROCERAS</b>		
<i>Bentleyi</i>	15 . . 3, f. 15, <i>a</i> . Var. f. 16.	
<i>ignobilis</i>	14 . . 3, f. 14.	
<i>Wrightii</i>	105 . . 13, f. 1.	
<b>PURPUROIDEA</b>		
<i>glabra</i>	28 . . 4, f. 5, <i>a</i> ; f. 6, <i>a</i> .	
<i>Moreausia</i>	27 . . 4, f. 1, <i>a</i> ; f. 2, 3 <i>a</i> , 4.	
<i>nodulata</i>	28 . . 5, f. 1, <i>a</i> ; f. 2, 3, 4.	
<b>RIMULA</b> [Cor. O.]		
<i>Blotii</i>	87 . . 8, f. 3, <i>a</i> , <i>b</i> , <i>c</i> . I.O.	
<i>clathrata</i>	86 . . 8, f. 1, <i>a</i> , <i>c</i> . I.O.	
<i>tricarinata</i>	86 . . 8, f. 2, <i>a—c</i> . I.O.	
<b>RISSOINA</b>		
<i>acuta</i>	53 . . 9, f. 9; 13, f. 9.	
<i>cancellata</i>	53 . . 9, f. 12, <i>a</i> .	
<i>duplicata</i>	52 . . 9, f. 10.	
<i>lævis</i>	54 . . 9, f. 16. I.O.	
<i>obliquata</i>	52 . . 9, f. 19. I.O.	
<i>tricarinata</i>	53 . . 9, f. 13.	
<b>SERPULA</b>		
<i>oblique-striata</i>	107 . . 5, f. 19, <i>a</i> .	
<b>SOLARIUM</b>		
<i>disculum</i>	70 . . 9, f. 25, <i>a</i> , <i>b</i> .	
<i>polygonium</i>	69 . . 9, f. 24, <i>a</i> , <i>b</i> .	
<i>varicosum</i>	69 . . 9, f. 23, <i>a</i> , <i>b</i> .	
<b>STOMATIA</b>		
<i>Buvignieri</i>	85 . . 9, f. 32, <i>a</i> .	
<b>TROCHOTOMA</b>		
<i>acuminata</i>	82 . . 10, f. 18 <i>a</i> , 20.	
<i>conuloides</i>	82 . . 10, f. 16.	
<i>discoidea</i>	84 . . 10, f. 10, <i>a</i> , <i>b</i> , <i>c</i> .	

	Page	Plate
<b>TROCHOTOMA</b> ( <i>continued</i> ).		
<i>extensa</i>	83 . . 10, f. 19 <i>a</i> , <i>b</i> .	
<i>obtusa</i>	83 . . 10, f. 15 <i>a</i> , <i>b</i> .	
<i>tabulata</i>	83 . . 10, f. 17, <i>a</i> .	
<b>TROCHUS</b>		
<i>anceus</i>	63 . . 10, f. 7, <i>a</i> .	
<i>Bunburii</i>	63 . . 10, f. 1, <i>a</i> , <i>b</i> .	
<i>Dunkeri</i>	61 . . 10, f. 3, <i>a</i> .	
<i>Ibbetsoni</i>	62 . . 10, f. 4, <i>a</i> .	
<i>obsoletus</i>	63 . . 11, f. 1, <i>a</i> .	
<i>pileolus</i>	63 . . 10, f. 5, <i>a</i> , <i>b</i> .	
<i>plicatus</i>	61 . . 10, f. 8, <i>a</i> .	
<i>squamiger</i>	62 . . 9, f. 34, <i>a</i> ; 13, f. 7.	
<i>spiratus</i>	106 . . 10, f. 2, <i>a</i> , <i>b</i> .; and 13, f. 6, <i>a</i> .	
<b>TURBO</b>		
<i>capitaneus</i>	65 . . 9, f. 33, <i>a</i> . I.O.	
<i>elaboratus</i>	64 . . 9, f. 27. I.O.	
<i>Gomondei</i>	66 . . 11, f. 5.	
<i>Hamptonensis</i>	64 . . 9, f. 30, <i>a</i> , <i>b</i> . I.O.	
<i>obtusus</i>	66 . . 11, f. 9, <i>a</i> ; 10, <i>a</i> .	
<i>pygmæus</i>	65 . . 9, f. 29, <i>a</i> .	
<i>Sharpei</i>	65 . . 9, f. 28, <i>a</i> .	
<b>UMBRELLA</b>		
<i>Hamptonensis</i>	95 . . 12, f. 12, <i>a</i> .	

## YORKSHIRE SHELLS.

<b>ACTÆON</b>		
<i>pullus</i>	119 . . 15, f. 11.	
<i>Sedgvici</i>	118 . . 15, f. 9.	
<b>ACTÆONINA</b>		
<i>gigantea</i>	119 . . 15, f. 13. I.O.	
<i>glabra</i>	120 . . 15, f. 11. I.O.	
<i>tumidula</i>	120 . . 15, f. 14.	
<b>ALARIA</b>		
<i>Phillipsii</i>	111 . . 15, f. 15 <i>a</i> . I.O.	
<b>AMMONITES</b>		
<i>Blagdeni</i>	110 . . 14, f. 3, <i>a</i> . I.O.	
<i>Braikenridgii</i>	111 . . 14, f. 1. I.O.	
<i>macrocephalus</i>	109 . . 14, f. 2.	
<b>BELEMNITES</b>		
<i>giganteus</i>	108 . . 14, f. 4. I.O.	

	Page	Plate		Page	Plate
CERITHIUM			PHASIANELLA		
Beanii	112 . . 15, f. 5.		latiuscula	117 . . 15, f. 16.	
gemmatum	115 . . 15, f. 6.		striata	118 . . 15, f. 19. I.O.	
CHEMNITZIA			SERPULA		
Scarburgensis	115 . . 15, f. 8.		intestinalis	121 . . 14, f. 7.	
vetusta	114 . . 15, f. 7.		plicatilis	121 . . 14, f. 5, <i>a, b</i> .	
EULIMA			sulcata	121 . . 14, f. 6.	
lævigata	114 . . 15, f. 4.		TROCHUS		
NATICA			Leckenbyi	115 . . 15, f. 21, <i>a</i> .	
adducta	112 . . 15, f. 17.		monilitectus	116 . . 15, f. 1, <i>a</i> . I.O.	
cincta	113 . . 15, f. 20.		TURBO		
punctura	112 . . 15, f. 18. C-b., I.O.		elaboratus	116 . . 15, f. 2, <i>a</i> . I.O.	
NERITA			VERMICULARIA		
pseudocostata	114 . . 15, f. 3, <i>a</i> . I.O.		nodus	120 . . 14, f. 8, <i>a, b</i> .	

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## INDEX OF SYNONYMS.

---

	Page		Page
ACTÆON		BELEMNITES ( <i>continued.</i> )	
acutus . . .	. 98	canaliculatus . . .	. 8
cuspidatus . . .	. 98	compressus . . .	. 108
glaber . . .	. 120	ellipticus . . .	. 108
ACTÆONINA		fleuriausius . . .	. 8
Deslongchampsia . . .	. 119	fusiformis . . .	. 8
Eparcyensis . . .	. 44	giganteus . . .	. 108
olivæformis . . .	. 103	gladius . . .	. 108
AMMONITES		grandis . . .	. 108
arbuscigerus . . .	. 12	BUCCINUM	
Blagdeni . . .	. 110	parvulum . . .	. 104
Braikenridgii . . .	. 111	unilineatum . . .	. 38
coronatus . . .	. 110	BULLA	
discus . . .	. 13	elongata . . .	. 101
gracilis . . .	. 105	olivæformis . . .	. 103
macrocephalus . . .	. 109	Thorentea . . .	. 101
terebratus . . .	. 109	undulata . . .	. 96
Triptolemus . . .	. 111	CASSIS	
AURICULA		Eparcyensis . . .	. 44
Sedgwicki . . .	. 118	CERITHIUM	
BELEMNITES		Blainvillii . . .	. 36
Aalensis . . .	. 108	Defranci . . .	. 33
Bessinus . . .	. 8	Dufrenoyi . . .	. 34

	Page		Page
CERITHIUM ( <i>continued</i> ).		NATICA ( <i>continued</i> ).	
limæforme . . . . .	30	grandis . . . . .	41
pentagonum . . . . .	30	Michelini . . . . .	44
strangulatum . . . . .	31	Verneuili . . . . .	44
quadricinctum . . . . .	29	NERINEA	
CHEMNITZIA		cylindrica . . . . .	36
Roissii . . . . .	32	Defranci . . . . .	33
vetusta . . . . .	114	funiculosa . . . . .	36
DELPHINULA		punctata . . . . .	35
coronata . . . . .	70	Voltzii . . . . .	32
stellata . . . . .	70	NERITA	
DITREMARIA		costata . . . . .	114
acuminata . . . . .	82	costulata . . . . .	57
conuloides . . . . .	82	hemisphærica . . . . .	58
EMARGINULA		mais . . . . .	58
Blotii . . . . .	87	minuta . . . . .	58
clathrata . . . . .	86	ovata . . . . .	58
Goldfussii . . . . .	86	pseudocostata . . . . .	114
scalaris . . . . .	88	pulla . . . . .	58
tricarinata . . . . .	86	sulcosa . . . . .	59
EUOMPHALUS		NERITOPSIS	
coronatus . . . . .	70	sulcosa . . . . .	59
FISSURELLA		varicosa . . . . .	106
acuta . . . . .	85	PATELLA	
FUSUS		ancyloides . . . . .	89
nodulosus . . . . .	23	Aubentonensis . . . . .	91
subnodulosus . . . . .	23	cingulata . . . . .	88
HELICION		costatula . . . . .	60
Aubentonensis . . . . .	91	mamillaris . . . . .	60
cingulata . . . . .	88	nana . . . . .	93
nana . . . . .	93	papyracea . . . . .	60
rugosa . . . . .	89	rugosa . . . . .	61
sulcata . . . . .	90	sulcata . . . . .	90
LIT TORINA		suprajurensis . . . . .	92
punctura . . . . .	112	Tessonii . . . . .	89
MELANIA		PATELLARIA	
striata . . . . .	118	sima . . . . .	61
MONODONTA		PHASIANELLA	
lævigata . . . . .	68	cincta . . . . .	113
Lyellii . . . . .	57	Leymeriei . . . . .	74
MUREX		striata . . . . .	118
nodulatus . . . . .	28	PILEOLUS	
tuberosus . . . . .	28	lævis . . . . .	60
NATICA		plicatus . . . . .	60
adducta . . . . .	112	PLEUROTOMA	
globosa . . . . .	43	longiscata . . . . .	40
		rissoides . . . . .	40



	Page		Page
PLEUROTOMARIA		SERPULA ( <i>continued</i> ).	
clathrata . . .	79	oblique-striata . . .	107
obesa . . .	79	plicatilis . . .	121
pagodus . . .	77	sulcata . . .	121
scalaris . . .	77	SIPHO	
PURPURA		clathrata . . .	86
Lapierrea . . .	28	SOLARIUM	
Moreausia . . .	27	coronatum . . .	70
PURPURINA		polygonum . . .	69
Moreausia . . .	27	TEREBRA	
unilineata . . .	38	nodosa . . .	55
PTEROCERAS		striata . . .	118
attractoides . . .	19	vetusta . . .	114
cirrus . . .	22	TORNATELLA	
hamulus . . .	17	cuspidata . . .	98
hamus . . .	16	gigantea . . .	119
paradoxa . . .	20	pulchella . . .	119
Phillipsii . . .	18	pulla . . .	119
RIMULA		TROCHOTOMA	
acuta . . .	85	acuminata . . .	82
clathrata . . .	86	conuloides . . .	82
RISSEA		TROCHUS	
acuta . . .	53	anceus . . .	63
duplicata . . .	52	discoideus . . .	84
lævis . . .	54	Labadyei . . .	68
obliquata . . .	52	monilitectus . . .	116
RISSOINA		obsoletus . . .	63
acuta . . .	53	plicatus . . .	61
duplicata . . .	52	spiratus . . .	106
obliquata . . .	52	TURBO	
ROSTELLARIA		capitaneus . . .	65
bicarinata . . .	21	Deslongchampsii . . .	68
bispinosa . . .	21	elaboratus . . .	116
cirrus . . .	22	Labadyei . . .	68
composita . . .	18	Lyellii . . .	67
hamulus . . .	17	obtusus . . .	66
hamus . . .	16	subobtusus . . .	66
trifida . . .	21	TURRITELLA	
SERPULA		Roissii . . .	32
intestinalis . . .	121	UTRICULUS	
		glaber . . .	120



PLATE I.

Fig.

1. *Nautilus Baberi*, *p.* 10, side view.

1*a.* — — front view.

2. *Nautilus subtruncatus*, *p.* 10, side view.

2*a.* — — front view.

3. *Ammonites gracilis*, *p.* 12, young ; and *p.* 105, Plate XIII, figs. 2, 2*a*, adult.

4. *Ammonites Waterhousei*, *p.* 13, side view.

4*a.* — — front view.

5. *Belemnites Bessinus*, *p.* 8.

7. — — showing the phragmacone.

6, 8. *Belemnites fusiformis*, *p.* 8.



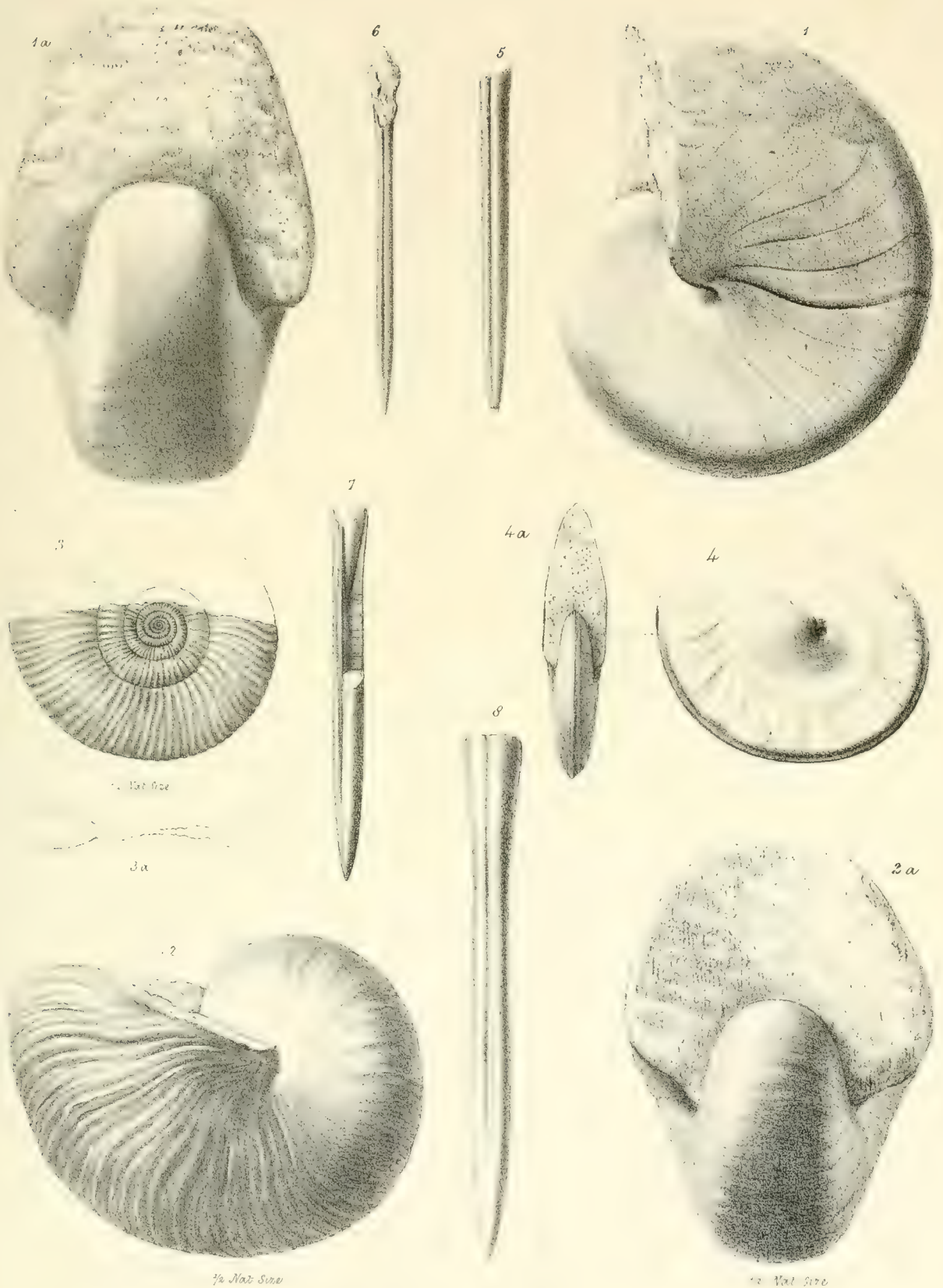




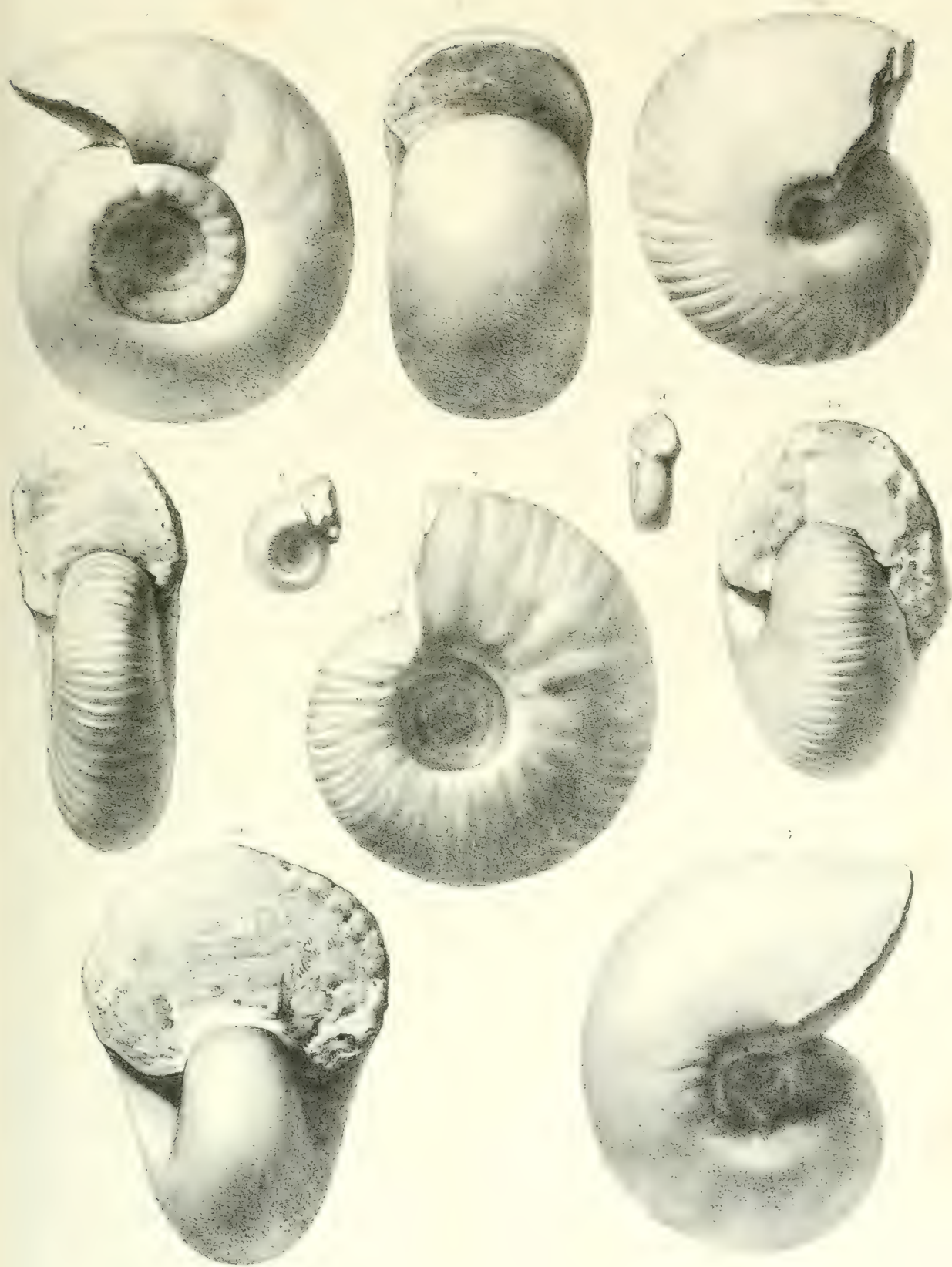




PLATE II.

Fig.

1. Ammonites subcontractus, *p.* 11, side view.
- 1 *a.* — — front view.
- 2, 2 *a.* — — young of.
3. Ammonites macrocephalus, var., *p.* 12, side view.
- 3 *a.* — — front view.
4. Ammonites arbustigerus, *p.* 12, side view.
- 4 *a.* — — front view.
5. Nautilus dispansus, *p.* 9, side view.
- 5 *a.* — — front view.





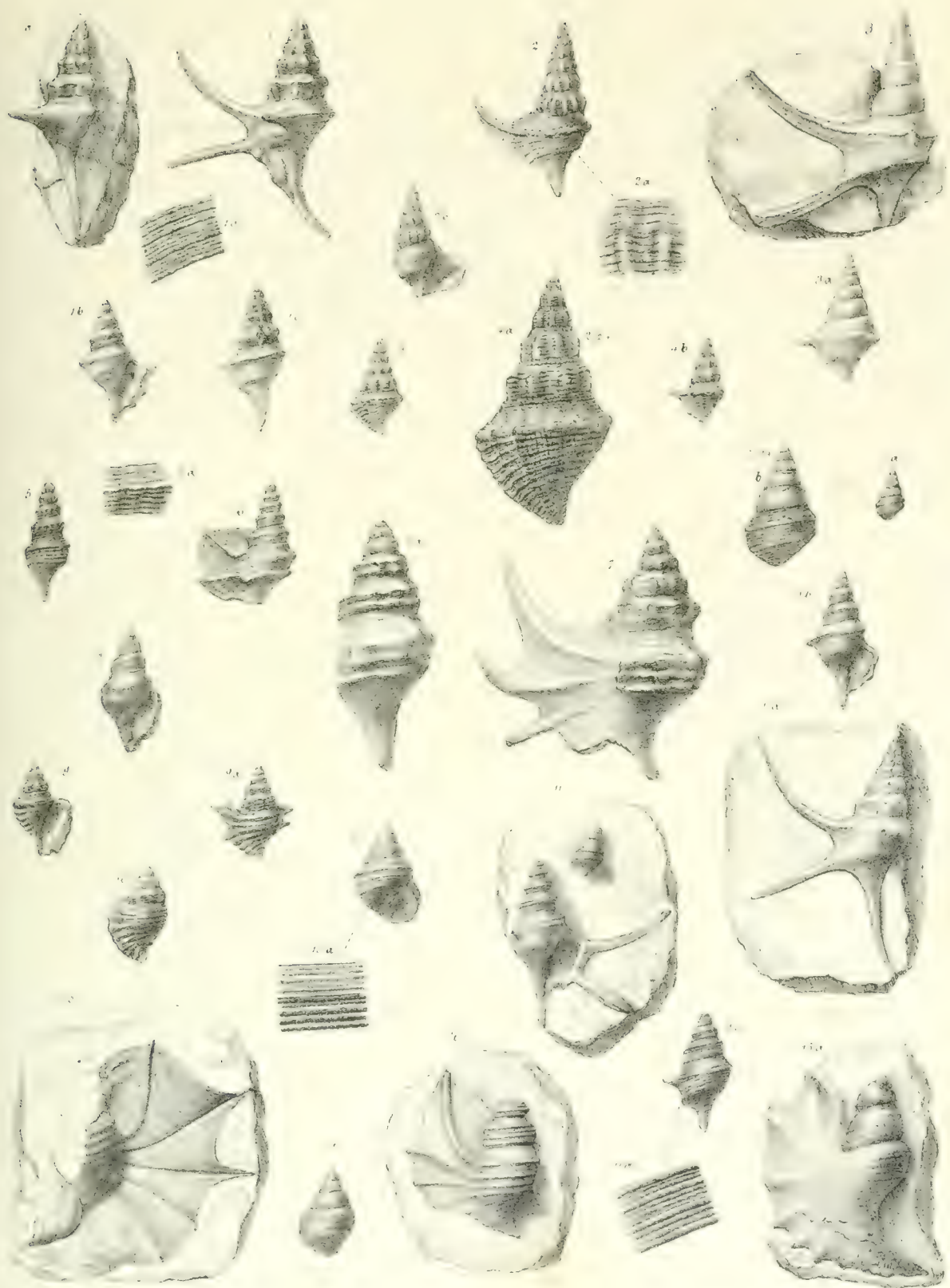




### PLATE III.

Fig.

- 1, 1*a*, *c*. *Alaria armata*, *p.* 16, back view.
- 1*b*. — — front view; *d*, portion magnified.
2. *Alaria hamus*, *p.* 16.
- 2*a*. — — portion magnified.
- 2*b*. — — front view.
- 3, 3*a*. *Alaria lævigata*, *p.* 17.
- 4, 4*b*. *Alaria hamulus*, *p.* 17, back view.
- 4*a*. — — specimen magnified.
5. *Alaria Phillipsii*, *p.* 18; and *p.* 111, Plate XV, figs. 15, 15*a*.
- 5*a*. — — portion magnified.
6. *Alaria pagoda*, *p.* 18; and Plate XIII, figs. 4, 4*a*.
- 7, 7*a*. *Alaria atractoides*, *p.* 19.
8. *Alaria hexagona*, *p.* 19.
9. *Alaria paradoxa*, *p.* 20, front view; and Plate XIII, fig. 3.
- 9*a*. — — var. *a*, back view.
10. — — back view.
- 11, 11*b*. *Alaria trifida*, *p.* 21, front view.
- 11*a*. — — back view.
- 11*c*. — — portion magnified.
- 12*a*. *Alaria parvula*, *p.* 22.
- 12*b*. — — magnified.
- 13, 13*a*. *Alaria cirrus*, *p.* 22.
14. *Pteroceras ignobilis*, *p.* 14.
15. — *Bentleyi*, *p.* 15, front view.
15. — — back view.
16. — — var. of, back view.









# PLATE IV.

Fig.

1. *Purpuroidea Moreausia*, *p.* 27, front view.
- 1*a.* — — back view.
2. — — back view, shell of advanced growth,  
larger specimen.
3. — — young shell, front view.
- 3*a.* — — young shell, back view.
4. — — cast of the interior.
5. *Purpuroidea glabra*, *p.* 28, front view.
- 5*a.* — — back view.
6. — — young shell, front view.
- 6*a.* — — young shell, back view.







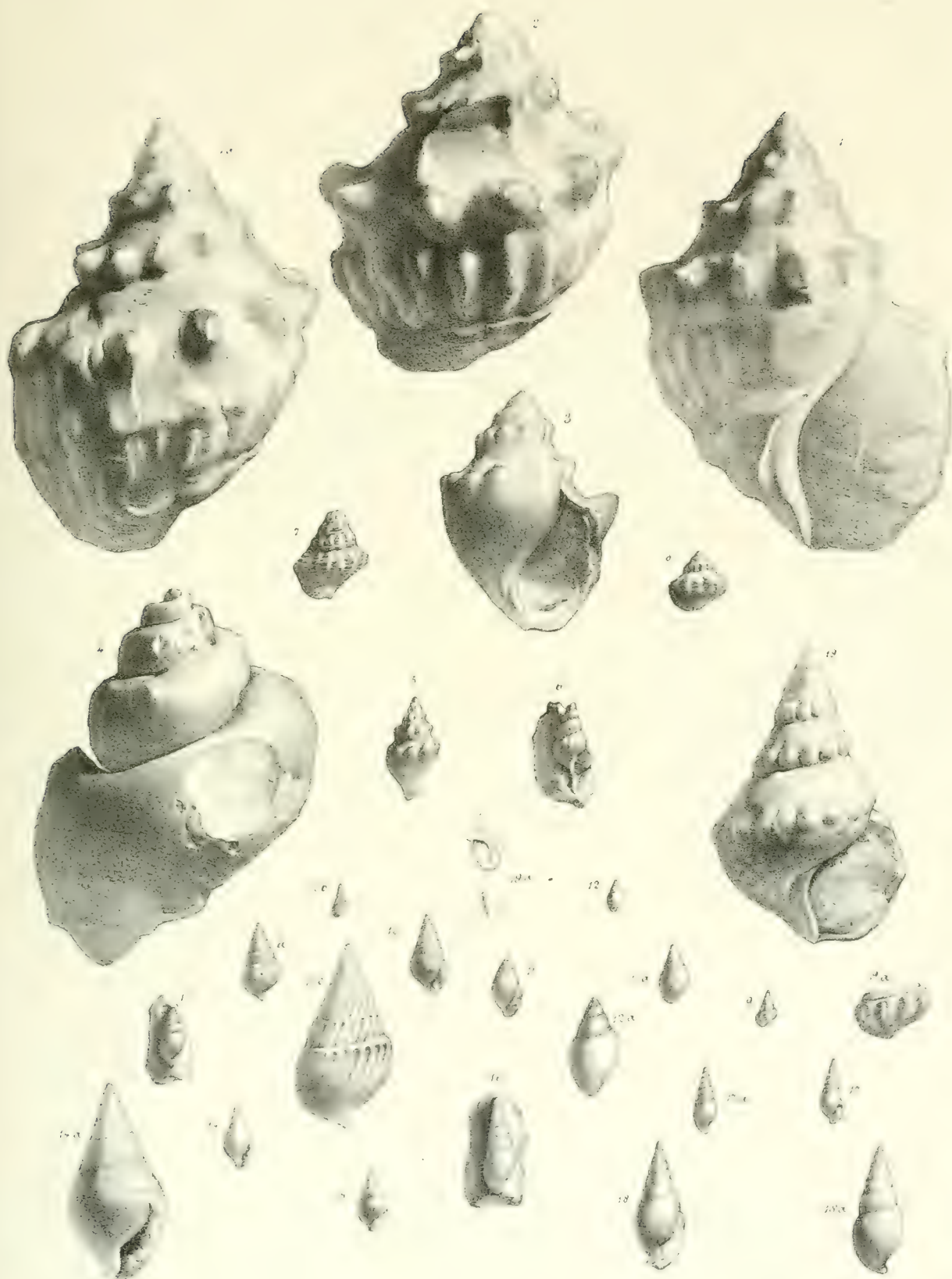




## PLATE V.

Fig.

1. *Purpuroidea nodulata*, *p.* 28, front view.
- 1*a.* — — — back view.
2. — — — another example.
3. — — — young shell, front view.
4. — — — cast of the interior.
5. *Fusus coronatus*, *p.* 23.
6. *Fusus multicostatus*, *p.* 23.
7. *Fusus* (*Brachytrema*) *Buvignieri*, *p.* 24.
8. *Delphinula Buckmani*, *p.* 71.
9. *Fusus subnodulosus*, *p.* 23.
- 9*a.* — — — portion enlarged.
10. *Ceritella conica*, *p.* 39, front view.
- 10*a.* — — — back view.
- 10*b.* — — — smaller example.
- 10*c.* — — — magnified twice.
11. *Actæonina parvula*, *p.* 104, front view.
- 11*a.* — — — back view.
12. — — — younger example.
- 12*a.* — — — adult, magnified twice.
13. *Ceritella unilineata*, *p.* 38, and Plate XIII, fig. 8, Plate IX, fig. 15, *var.*
14. *Ceritella planata*, *p.* 38, natural size.
- 14*a.* — — — magnified three times.
15. *Ceritella mitralis*, *p.* 39.
16. *Ceritella Sowerbii*, *p.* 38.
17. *Ceritella acuta*, *p.* 37, young, front view.
- 17*a.* — — — young, back view.
18. — — — adult, front view.
- 18*a.* — — — adult, back view.
19. *Pagodus* (*Amberlya*) *nodosa*, *p.* 55.





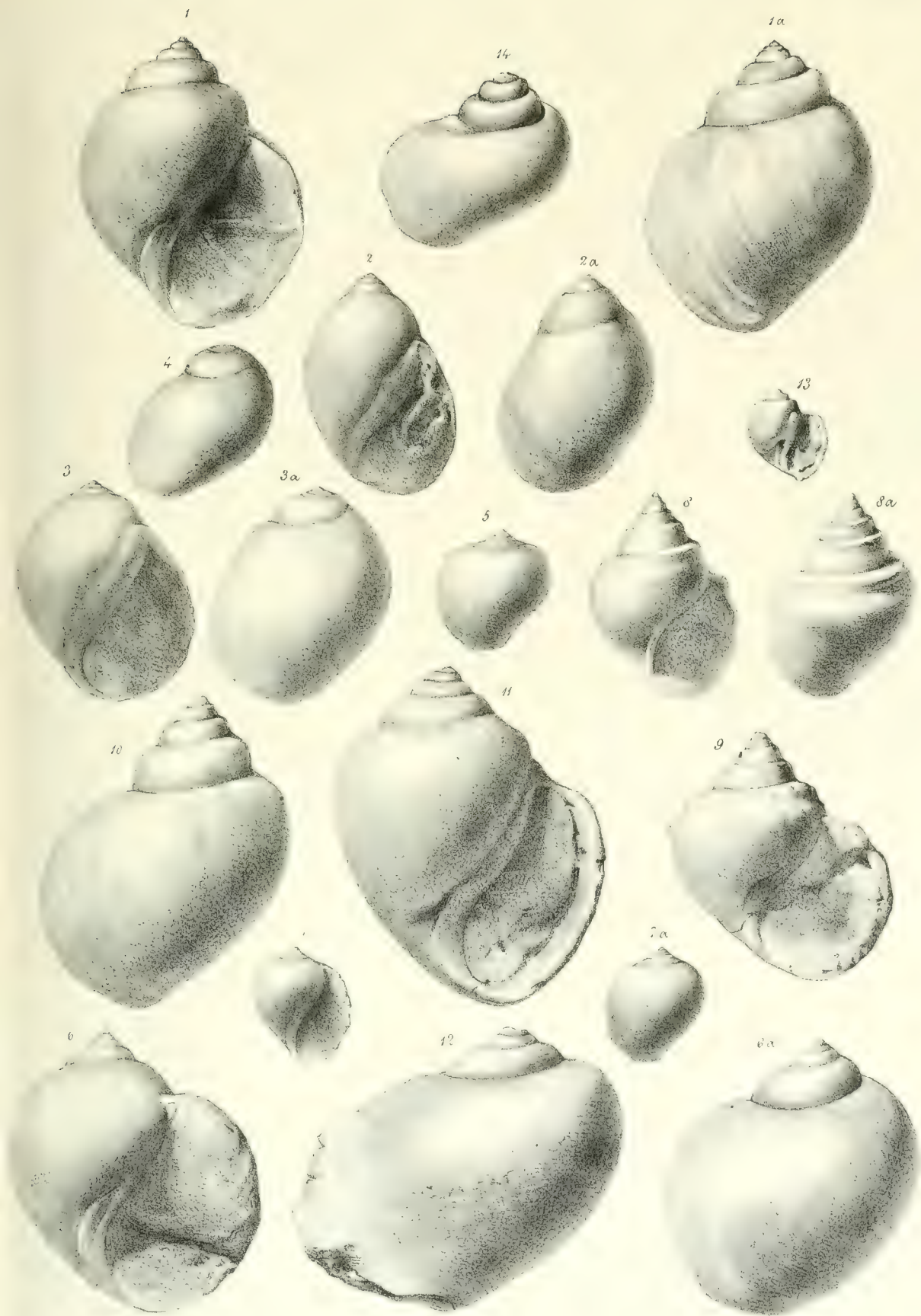




## PLATE VI.

Fig.

1. *Natica intermedia*, *p.* 41, front view.
- 1*a.* — — back view.
2. *Natica Michelini*, *p.* 44, front view, elongated variety.
- 2*a.* — — back view, elongated variety.
3. — — another example, front view.
- 3*a.* — — another example, back view.
4. *Natica neritoidea*, *p.* 43.
5. — *ambigua*, *p.* 44.
6. — *Verneuili*, *p.* 44, front view.
- 6*a.* — — back view.
7. — — young shell, front view.
- 7*a.* — — young shell, back view.
8. *Natica (Euspira) pyramidata*, *p.* 46, front view.
- 8*a.* — — — back view.
9. *Natica (Euspira) coronata*, *p.* 46.
10. — *formosa*, *p.* 42.
11. — *Tancredi*, *p.* 42.
12. — *grandis*, *p.* 41.
13. *Natica (Euspira) subcanaliculata*, *p.* 47.
14. *Natica globosa*, *p.* 43.





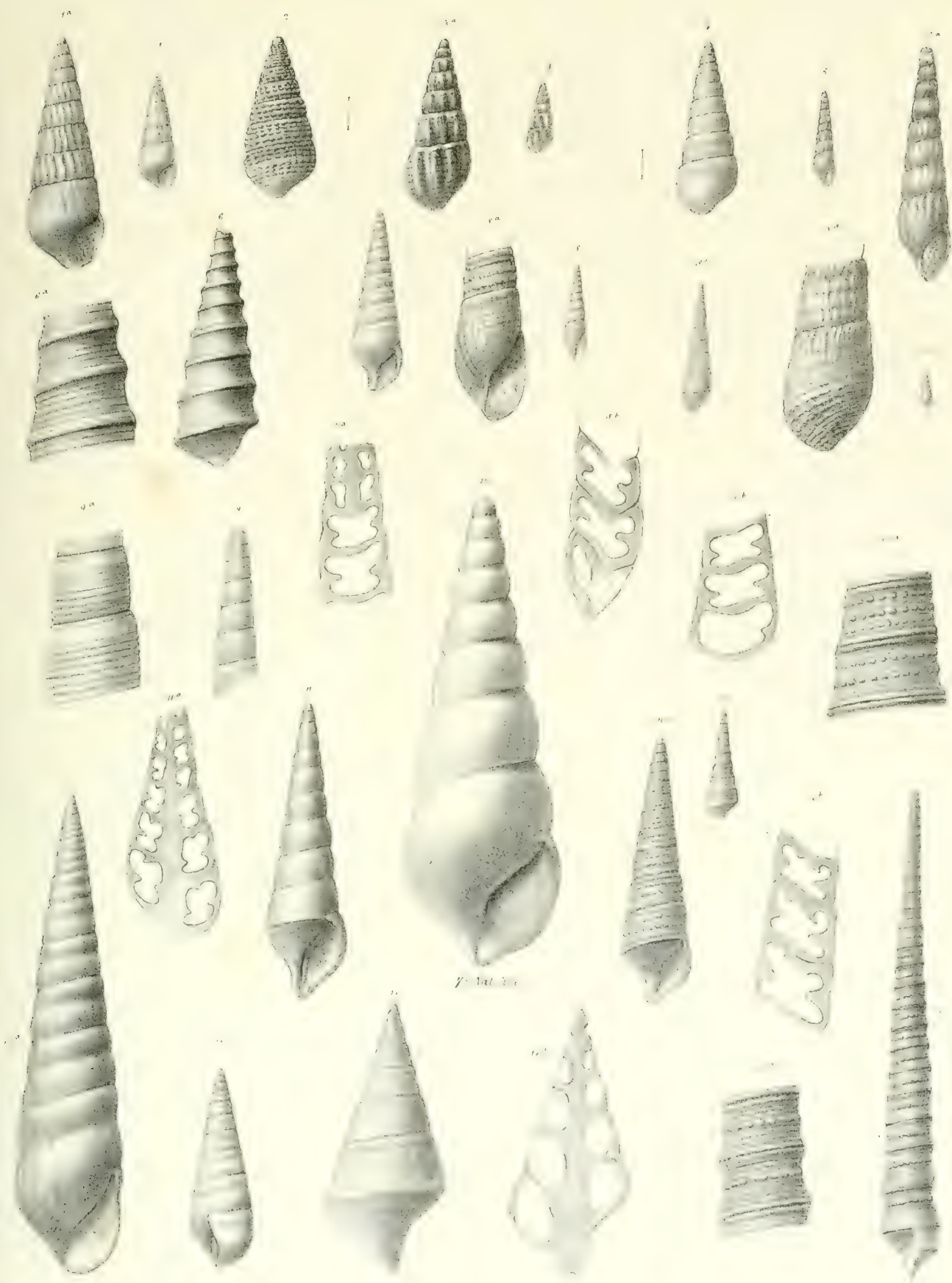




# PLATE VII.

Fig.

1. Chemnitzia Hamptonensis, *p.* 50.
- 1*a.* — — magnified.
2. Cerithium limæforme, *p.* 30.
3. — sexcostatum, *p.* 30.
- 3*a.* — — magnified.
4. Chemnitzia Leckenbyi, *p.* 50, magnified.
5. — Wetherellii, *p.* 50.
- 5*a.* — — magnified.
6. Nerinæa Eudesii, *p.* 33.
- 6*a.* — — magnified.
7. Nerinæa Voltzii, *p.* 32, young.
- 7*a.* — — section magnified.
8. Nerinæa Dufrenoyi, *p.* 34.
- 8*a.* — — magnified.
- 8*b.* — — section magnified.
- 8*c.* 8*e.* — — *p.* 34, another variety.
- 8*d.* — — portion magnified.
9. Nerinæa Stricklandi, *p.* 35
- 9*a.* — — portion magnified.
- 10, 10*c.* Nerinæa punctata, *p.* 35.
- 10*a.* — — portion of external surface magnified.
- 10*b.* — — section magnified.
11. Nerinæa Voltzii, *p.* 32.
- 11*a.* — — section.
12. Nerinæa funiculis, *p.* 36.
- 12*a.* — — portion of the surface magnified.
- 12*b.* — — section magnified.
13. Chemnitzia Lonsdalei, *p.* 49, the young shell.
- 13*a.* — — the adult shell.
14. Cerithium Roissii, *p.* 32.
- 14*a.* — — section of the shell.
15. Chemnitzia simplex, *p.* 49, reduced one half.









# PLATE VIII.

Fig.

1, 1 <i>a</i> .	<i>Rimula clathrata</i> , <i>p.</i> 86.
1 <i>b</i> , 1 <i>c</i> .	— — magnified.
2, 2 <i>a</i> .	<i>Rimula tricarinata</i> , <i>p.</i> 86.
2 <i>b</i> , 2 <i>c</i> .	— — magnified.
3, 3 <i>a</i> .	<i>Rimula Blotii</i> , <i>p.</i> 87.
3 <i>b</i> , 3 <i>c</i> .	— — magnified.
4, 4 <i>a</i> , 4 <i>b</i> .	<i>Emarginula scalaris</i> , <i>p.</i> 88.
4 <i>c</i> .	— — under surface magnified.
5, 5 <i>a</i> .	<i>Fissurella acuta</i> , <i>p.</i> 85.
5 <i>b</i> , 5 <i>c</i> .	— — specimen magnified.
6, 6 <i>a</i> .	<i>Nerita costulata</i> , <i>p.</i> 57.
6 <i>b</i> , <i>c</i> .	— — specimen magnified.
7, 7 <i>a</i> .	<i>Chemnitzia variabilis</i> , <i>p.</i> 51.
7 <i>b</i> .	— — magnified.
8, 8 <i>a</i> .	<i>Bulla undulata</i> , <i>p.</i> 96.
9, 9 <i>b</i> .	<i>Cylindrites acutus</i> , <i>p.</i> 98.
9 <i>a</i> .	— — magnified.
10.	<i>Cylindrites cuspidatus</i> , <i>p.</i> 98.
10 <i>a</i> .	— — magnified.
11, 11 <i>a</i> .	<i>Cylindrites angulatus</i> , <i>p.</i> 99.
11 <i>b</i> .	— — magnified.
12, 12 <i>a</i> .	<i>Cylindrites altus</i> , <i>p.</i> 99.
12 <i>b</i> .	— — magnified.
12*.	<i>Actæonina</i> ?
13, 13 <i>a</i> .	<i>Cylindrites brevis</i> , <i>p.</i> 101.
13 <i>b</i> .	— — magnified.
14.	<i>Actæonina olivæformis</i> , <i>p.</i> 103.
15.	<i>Actæonina bulimoides</i> , <i>p.</i> 104.
16, 16 <i>a</i> , 16 <i>b</i> .	<i>Bulla loliolum</i> , <i>p.</i> 96.
17, 17 <i>a</i> .	<i>Cylindrites excavatus</i> , <i>p.</i> 100.
17 <i>b</i> .	— — magnified section.
18, 18 <i>b</i> .	<i>Cylindrites bullatus</i> , <i>p.</i> 102.
18 <i>a</i> , 18 <i>c</i> .	— — magnified.
19, 19 <i>a</i> .	<i>Cylindrites cylindricus</i> , <i>p.</i> 100.
19 <i>b</i> , <i>c</i> .	— — view of apex, and section of the same.
20, 20 <i>b</i> , 20 <i>c</i> , 21.	<i>Cylindrites pyriformis</i> , <i>p.</i> 102.
20 <i>a</i> .	— — magnified.
22, 22 <i>b</i> .	<i>Cylindrites Thorenti</i> , <i>p.</i> 101.
22 <i>a</i> , 22 <i>c</i> .	— — magnified.





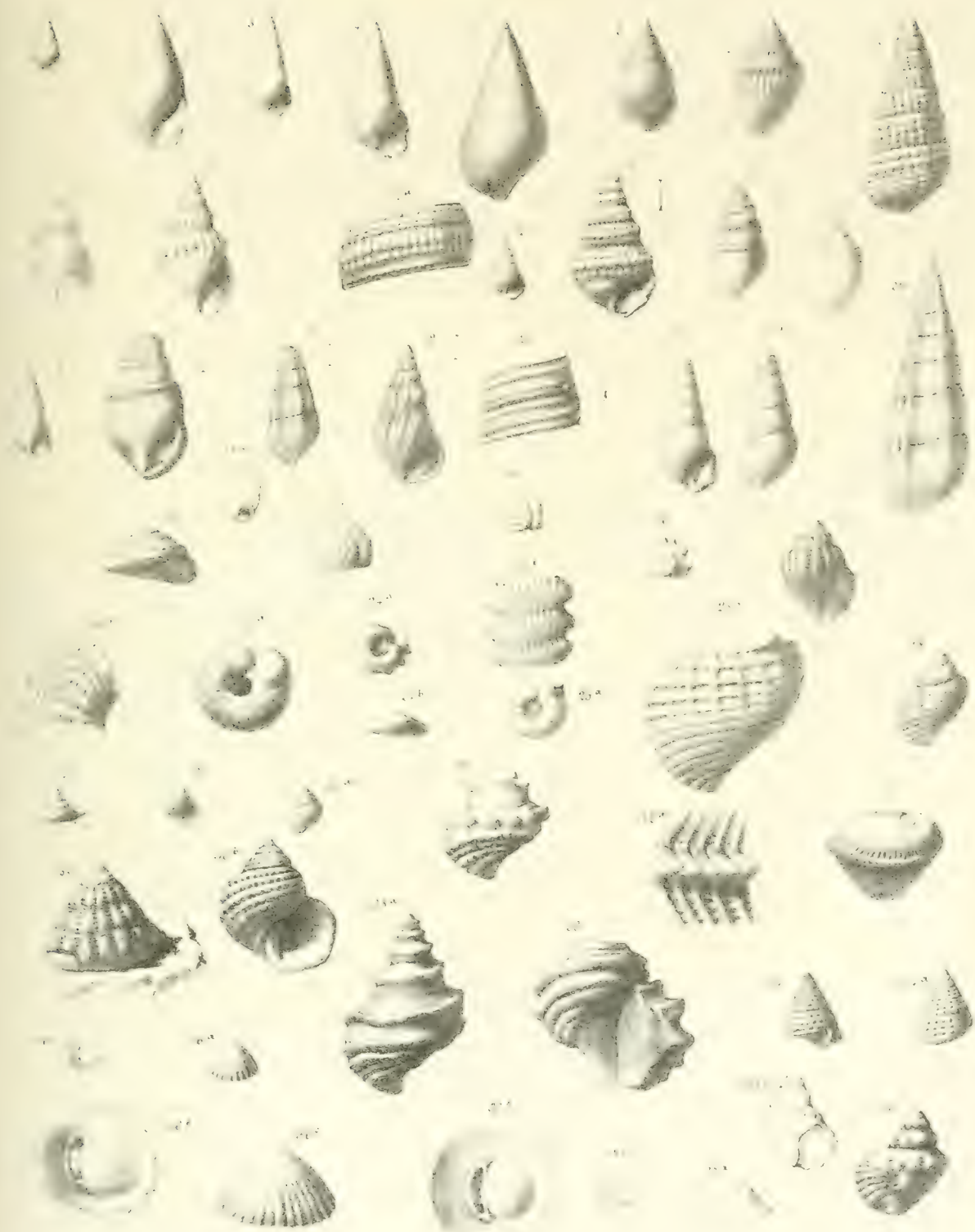




## PLATE IX.

- Fig.
1. *Eulima pygmæa*, *p.* 48.
  2. *Phasianella acutiuscula*, *p.* 75, and Plate XI, fig. 28.
  - 3, 4. *Eulima vagans*, *p.* 48.
  5. *Chemnitzia phasianoides*, *p.* 51.
  6. *Eulima subglobosa*, *p.* 49.
  7. *Ceritella rissoides*, *p.* 40.
  8. *Cerithium quadricinctum*, *p.* 29.
  9. *Rissoina acuta*, *p.* 53, and Plate XIII, fig. 9.
  10. *Rissoina duplicata*, *p.* 52.
  - 12, 12*a*. *Rissoina cancellata*, *p.* 53.
  13. *Rissoina tricarinata*, *p.* 53.
  14. *Ceritella longiscata*, *p.* 40.
  15. *Ceritella unilineata*, ? from Ancliff, *p.* 38.
  16. *Rissoina*? *lævis*, *p.* 54.
  17. *Ceritella gibbosa*, *p.* 37.
  18. *Cerithium strangulatum*, *p.* 31.
  - 18*a*. — — — showing the contracted aperture.
  19. *Rissoina obliquata*, *p.* 52.
  20. *Cerithium Tennanti*, *p.* 32.
  21. *Eulima communis*, *p.* 48, front view.
  - 21*a*. — — — back view.
  22. *Cerithium pentagonum*, *p.* 30.
  23. *Solarium varicosum*, *p.* 69.
  - 23*a*. — — — view of the base.
  - 23*b*. — — — surface magnified.
  - 24, 24*a*, *b*. *Solarium polygonium*, *p.* 69.
  - 25, 25*a*, *b*. *Solarium disculum*, *p.* 70.
  26. *Delphinula coronata*, *p.* 70.
  27. *Turbo elaboratus*, *p.* 64.
  28. *Turbo Sharpei*, *p.* 65,
  - 28*a*. — — — surface magnified.
  29. *Turbo pygmæa*, *p.* 65.
  - 29*a*. — — — magnified view.
  - 30, 30*a*. *Turbo Hamptonensis*, *p.* 64.
  - 30*b*. — — — magnified view.
  31. *Delphinula alta*, *p.* 71.
  32. *Stomatia*? *Buvignieri*, *p.* 85.
  - 32*a*. — — — surface magnified.
  - 33, 33*a*. *Turbo capitaneus*, *p.* 65.
  34. *Trochus squamiger*, *p.* 62,\* and Plate XIII, fig. 7.
  - 34*a*. — — — back view.
  35. *Fusus* (*Brachytrema*) *turbiniiformis*, *p.* 25.
  - 35*a*. — — — front view.
  - 36, 36*a*. *Pileolus plicatus*, *p.* 60.
  - 36*b*. — — — view of the base and aperture magnified.
  - 36*c*. — — — side view magnified.
  - 37, 37*a*. *Pileolus lævis*, *p.* 60.
  - 37*b*. — — — view of the base and aperture magnified.

\* *Incorrectly printed as Plate X, figs. 2, 2*a*, *b*.*





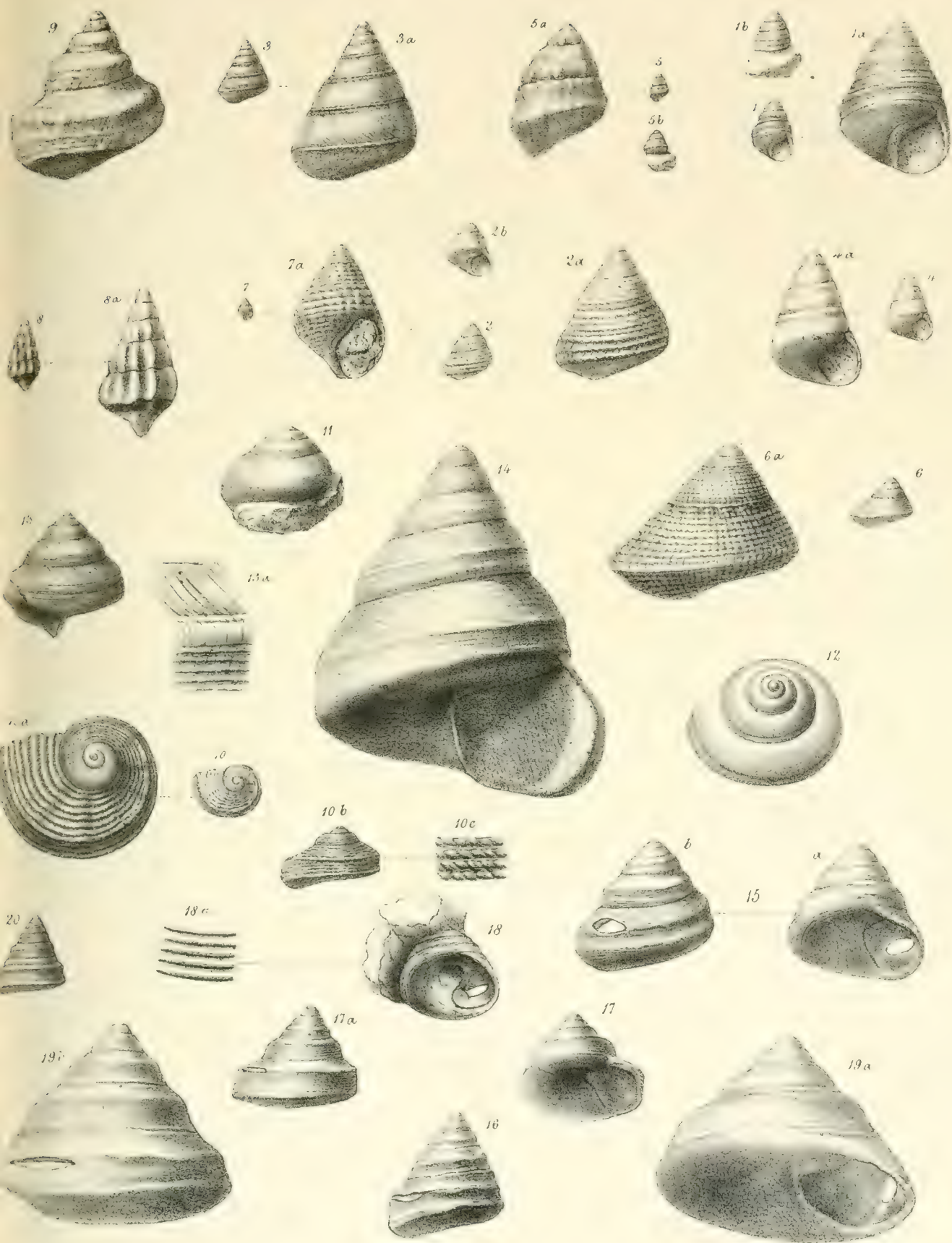




# PLATE X.

Fig.

1. *Trochus Bunburyi*, *p.* 63.
  - 1*a.* — — magnified three times.
  - 1*b.* — — back view.
2. *Trochus spiratus* ? *var.*, *p.* 106, and Plate XIII, fig. 6.
  - 2*a.* — magnified.
  - 2*b.* — front view.
3. *Trochus Dunkeri*, *p.* 61.
  - 3*a.* — — magnified.
4. *Trochus Ibbetsoni*, *p.* 62.
  - 4*a.* — — magnified.
5. *Trochus pileolus*, *p.* 63.
  - 5*a.* — — magnified.
  - 5*b.* — — another example.
6. *Pleurotomaria clathrata*, *p.* 79.
  - 6*a.* — — magnified three times.
7. *Trochus anceus*, *p.* 63.
  - 7*a.* — — specimen magnified.
8. *Trochus plicatus*, *p.* 61.
  - 8*a.* — — magnified.
9. *Pleurotomaria pagodus*, *p.* 77.
10. *Trochotoma discoidea*, *p.* 84, upper surface.
  - 10*a.* — — magnified.
  - 10*b.* — — side view.
  - 10*c.* — — costæ magnified.
11. *Pleurotomaria obesa*, *p.* 79.
12. *Pleurotomaria discoidea*, *p.* 78.
13. *Pleurotomaria composita*, *p.* 80.
  - 13*a.* — — portion magnified.
14. *Pleurotomaria scalaris*, *p.* 77.
15. *Trochotoma obtusa*, *p.* 83.
  - 15*a.* — — front.
  - 15*b.* — — back view.
16. *Trochotoma conuloides*, *p.* 82.
17. *Trochotoma tabulata*, *p.* 83.
  - 17*a.* — — front view.
- 18*a.* *Trochotoma obtusa* ?, *p.* 83, base.
  - 18*b.* — — surface magnified.
- 19*a.* *Trochotoma extensa*, *p.* 83.
  - 19*b.* — — back view.
20. *Trochotoma acuminata*, *p.* 82.









# PLATE XI.

Fig.

1. *Trochus obsoletus*, *p.* 63.
- 1*a.* — — magnified view.
2. *Monodonta Labadyei*, *p.* 68.
3. *Monodonta imbricata*, *p.* 67.
- 3*a.* — — magnified view.
4. *Monodonta Lyellii*, *p.* 67, front view.
- 4*a.* — — back view.
- 4*b.* — — the shell magnified.
5. *Turbo Gomondei*, *p.* 66.
- 6, 6*a.* *Monodonta formosa*, *p.* 68.
- 6*b.* — — magnified view.
- 7, 7*a.* *Delphinula* (*Crossostoma*) *discoideum*, *p.* 73.
- 7*b.* — — — magnified view.
8. *Delphinula* (*Crossostoma*) *heliciforme*, *p.* 73.
9. *Turbo obtusus*, *var.*, *p.* 66.
- 9*a.* — — magnified view.
10. *Turbo obtusus*, *p.* 66.
- 10*a.* — — magnified view.
- 11, 11*a.* *Monodonta Labadyei*, *p.* 68.
12. *Neritopsis sulcosa*, *p.* 59.
13. *Neritopsis striata*, *p.* 59, front view.
- 13*a.* — — back view.
14. *Nerita hemisphærica*, *p.* 58, front view.
- 14*a.* — — back view.
15. *Nerita cancellata*, *p.* 56, front view.
- 15*a.* — — back view.
- 15*b.* — — a portion of the surface magnified.
- 16, 16*a.* *Nerita hemisphærica*, *p.* 58, a smooth variety.
- 17, 17*a.* *Nerita rugosa*, *p.* 56.
- 18, 18*a.* *Nerita costulata*, *p.* 57.
- 18*b.* — — a portion magnified.
- 19, 19*a.* *Nerita minuta*, *p.* 58.
- 20, 20*a.* *Neritopsis varicosa*, *p.* 106, and Plate XIII, fig. 5.
21. *Delphinula* (*Crossostoma*) *Prattii*, *p.* 77.
- 21*a.* — — — an enlarged view.
22. *Natica* (*Euspira*) *Sharpei*, *p.* 46.
23. *Natica* (*Euspira*) *canaliculata*, *p.* 45.
23. — — — back view.
24. *Natica Stricklandi*, *p.* 42.
- 24*a.* — — back view.
- 25, 25*a.* *Phasianella tumidula*, *p.* 76.
26. *Phasianella nuciformis*, *p.* 75.
- 27, 27*a.* *Phasianella elegans*, *p.* 74.
- 28, 28*a.* *Phasianella acutiuscula*, *p.* 75, and Plate IX, fig. 2.
29. *Phasianella parvula*, *p.* 75.
29. — — magnified view.
- 30, 30*a.* *Phasianella conica*, *p.* 74.
- 31, 31*a.* *Phasianella Leymeriei*, *p.* 74.
32. — — a globose variety.



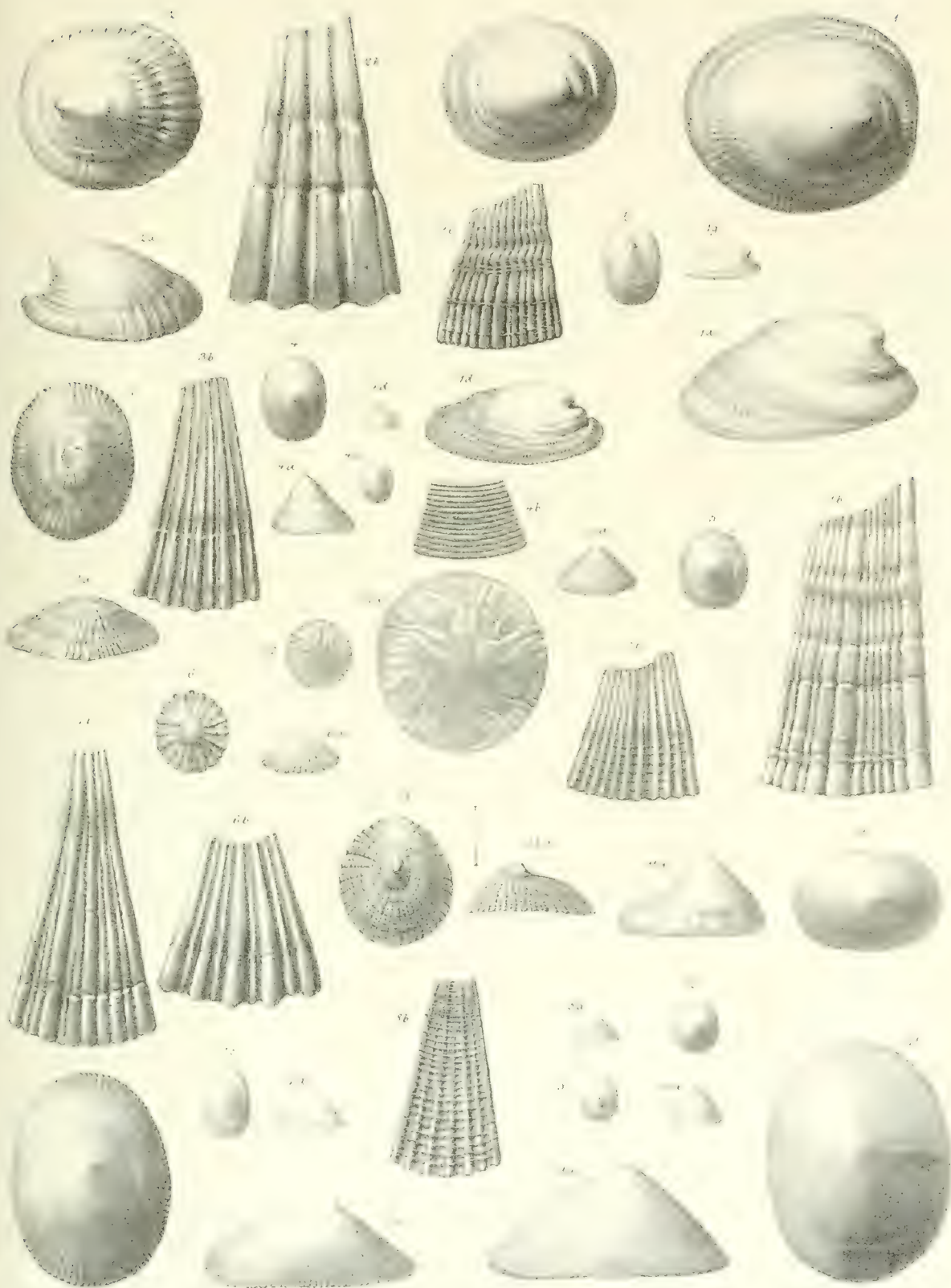






## PLATE XII.

Fig.			
1, 1 <i>a</i> .	Patella	<i>rugosa</i> , <i>p.</i> 89,	variety with large costæ.
1 <i>b</i> .	—	—	magnified portion of the surface of figs. 1, 1 <i>a</i> .
1 <i>c</i> , 1 <i>d</i> .	—	—	variety with fine costæ.
1 <i>e</i> .	—	—	magnified portion of the surface of figs. 1 <i>c</i> , 1 <i>d</i> .
1 <i>f</i> , 1 <i>g</i> .	—	—	the young shell.
2, 2 <i>a</i> .	Patella	<i>paradoxa</i> , <i>p.</i> 90.	
2 <i>b</i> .	—	—	magnified portion of the surface.
3, 3 <i>a</i> .	Patella	<i>sulcata</i> , <i>p.</i> 90.	
3 <i>b</i> .	—	—	magnified portion of the surface.
4, 4 <i>a</i> , <i>c</i> , <i>d</i> .	Patella	<i>cingulata</i> , <i>p.</i> 88.	
4 <i>b</i> .	—	—	magnified portion of the surface.
5, 5 <i>a</i> .	Patella	<i>striatula</i> , <i>p.</i> 91.	
5 <i>b</i> .	—	—	magnified portion of the surface.
6, 6 <i>a</i> .	Patella	<i>Roemeri</i> , <i>p.</i> 91.	
6 <i>b</i> .	—	—	magnified portion of the surface.
7, 7 <i>a</i> .	Patella	<i>Aubentonensis</i> , <i>p.</i> 91.	
7 <i>b</i> .	—	—	magnified portion of the surface.
7 <i>c</i> , 7 <i>d</i> .	—	—	the young shell.
8, 8 <i>a</i> .	Patella	<i>arachnoidea</i> , <i>p.</i> 92.	
8 <i>b</i> .	—	—	portion of the surface magnified.
9, 9 <i>a</i> .	Patella	<i>suprajurensis</i> , <i>p.</i> 92.	
10, 10 <i>a</i> .	Patella	<i>nana</i> , <i>p.</i> 93.	
11, 11 <i>a</i> .	Patella	<i>inornata</i> , <i>p.</i> 93.	
12.	Umbrella?	<i>Hamptonensis</i> , <i>p.</i> 95.	
12 <i>a</i> .	—	—	the surface magnified three times.
13, 13 <i>a</i> .	Deslongchampsia	<i>Eugenei</i> , <i>p.</i> 94,	magnified twice.





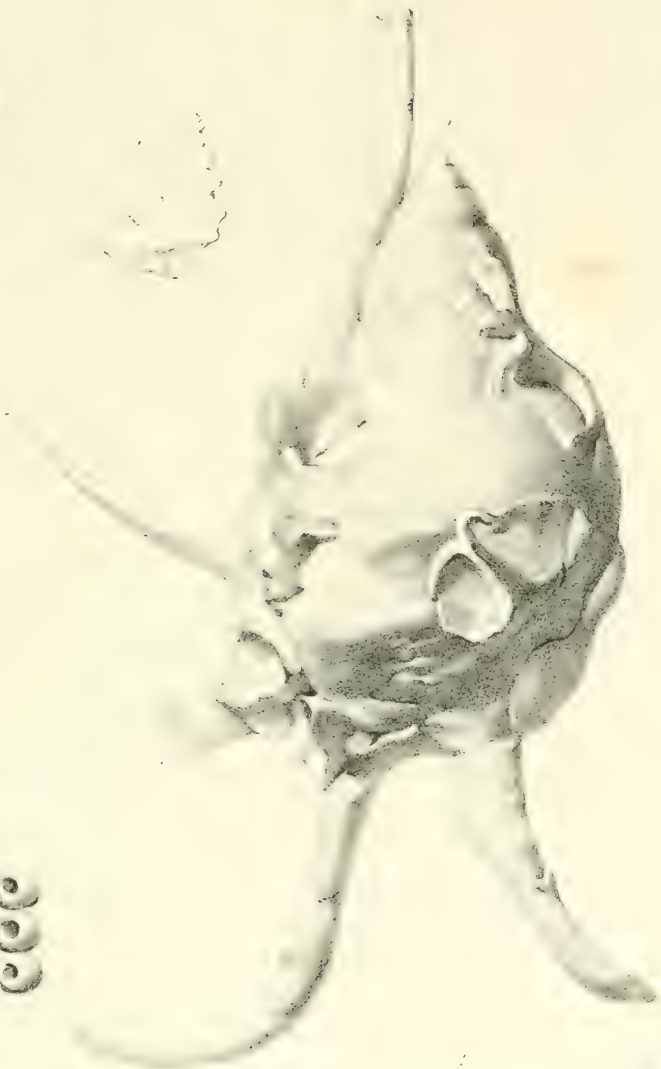
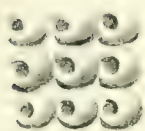




### PLATE XIII.

Fig.

1. *Pteroceras Wrightii*, *p.* 105. (In Dr. Wright's collection.)
2. *Ammonites gracilis*, and Plate I, fig. 3, *pp.* 12 and 105.
- 2*a.* — — front view. (In Prof. J. Buckman's collection.)
3. *Alaria paradoxa*, and Plate III, figs. 9, 10, *p.* 20.
4. *Alaria pagoda*, and Plate III, fig. 18, *p.* 18.
- 4*a.* — — magnified view.
5. *Neritopsis varicosa*, and Plate XI, fig. 20, *p.* 106.
6. *Trochus spiratus*, and Plate X, fig. 2, *var.*, *p.* 106.
- 6*a.* — — magnified view.
7. *Trochus squamiger*, and Plate IX, fig. 34, *p.* 62. Magnified view of a portion of the surface.
8. *Ceritella unilineata*, and Plate V, fig. 13, *p.* 38.
9. *Rissoina?* *acuta*, and Plate IX, fig. 9, *p.* 53.
10. *Nerinea Eudesii*, and Plate VII, fig. 6, *p.* 33. Section of interior.
11. *Nerinea Voltzii*, and Plate VII, fig. 11, *p.* 32. Section of interior.









## PLATE XIV.

### YORKSHIRE SHELLS.

Fig.

1. Ammonites Braikenridgii, *p.* 111, reduced one half.
2. Ammonites macrocephalus, *p.* 109, reduced one half.
- 3*a.* Ammonites Blagdeni, *p.* 110, side view.
- 3*b.* — — — front view, reduced one half.
4. Belemnites giganteus, *p.* 108.
- 4*a.* — — — transverse section.
- 5*a.* Serpula plicatilis, *p.* 121.
- 5*b.* — — — magnified view.
- 5*c.* — — — transverse section.
6. Serpula sulcata, *p.* 121.
7. Serpula intestinalis, *p.* 121.
- 8*a, b.* Vermicularia nodus, *p.* 120.









# PLATE XV.

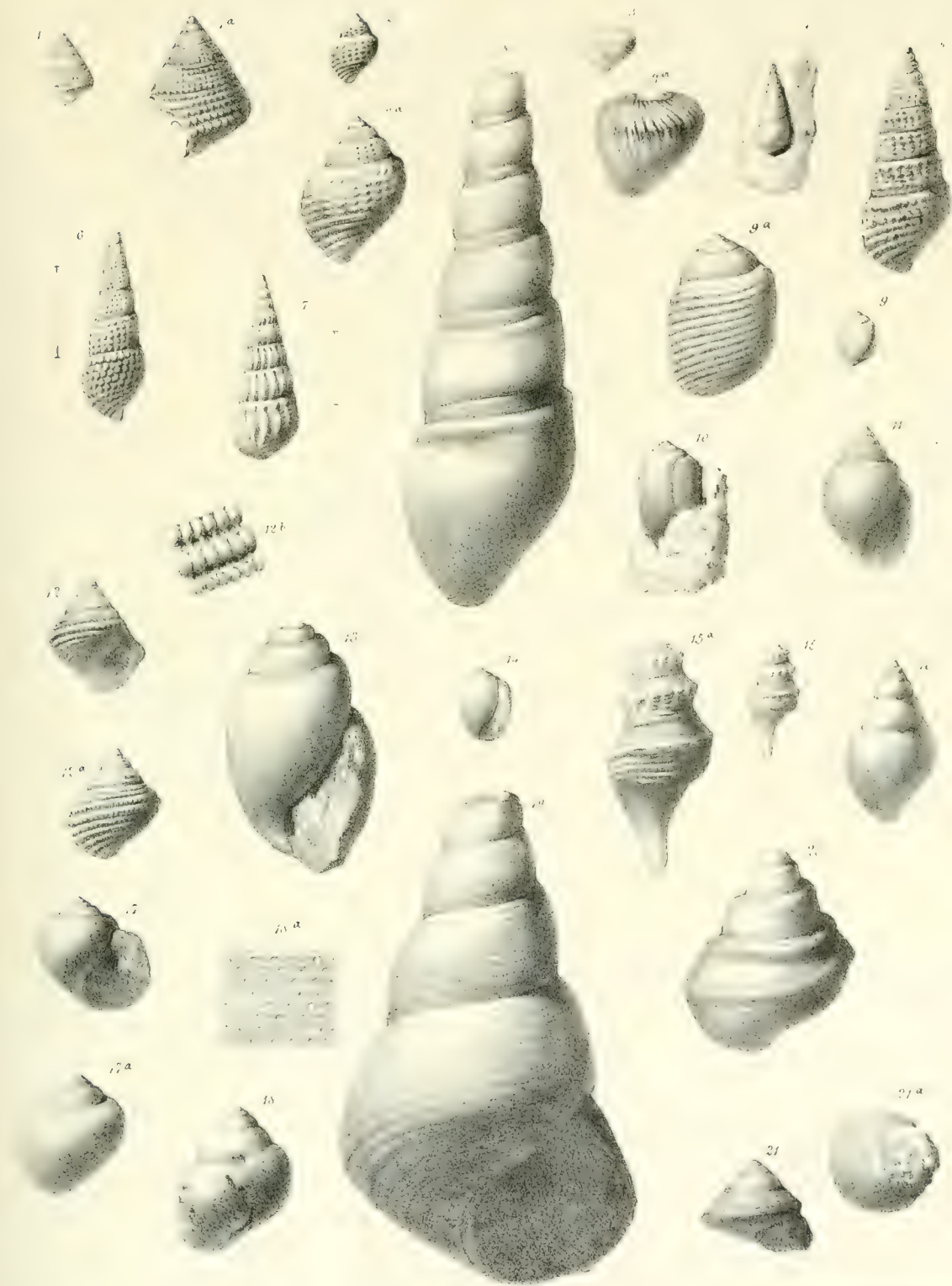
## YORKSHIRE SHELLS.

Fig.

1. *Trochus monilitectus*, *p.* 116.
- 1*a.* — — — magnified view.
2. *Turbo elaboratus*, and Plate IX, fig. 27, *p.* 116.
- 2*a.* — — — magnified view.
3. *Nerita pseudocostata*, *p.* 114.
- 3*a.* — — — magnified view.
4. *Eulima levigata*, *p.* 114.
5. *Cerithium Beanii*, *p.* 112.
6. *Cerithium gemmatum*, *p.* 115.
7. *Chemnitzia*? *vetusta*, *p.* 114.\*
8. *Chemnitzia*? *Scarburgensis*, *p.* 115.
9. *Actæon Sedgvici*, *p.* 118.
10. *Actæonina glabra*, *p.* 120.
11. *Actæon pullus*, *p.* 118.
12. *Turbo Phillipsii*, *p.* 117.
- 12*a.* — — — back view.
- 12*b.* — — — surface magnified.
13. *Actæonina gigantea*, *p.* 119.
14. *Actæonina tumidula*, *p.* 120.
15. *Alaria composita*, *var.* *Phillipsii*, and Plate III, fig. 5, *p.* 111, and *p.* 18.
- 15*a.* — — — magnified view.
16. *Phasianella latiuscula*, *p.* 117.
17. *Natica adducta*, *p.* 112, front view.
- 17*a.* — — — back view.
18. *Natica punctura*, *p.* 112.
- 18*a.* — — — surface magnified.
19. *Phasianella striata*, *p.* 118.
20. *Natica* (*Euspira*)? *cincta*, *p.* 113.
- 21, 21*a.* *Trochus*? *Leckenbyi*, *p.* 115. (In Mr. Leckenby's collection.)

\* In this figure the costæ near the suture are too much indented.

# YORKSHIRE SHELLS

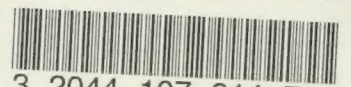












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